AVIATION WEEK

AUGUST 7, 1950

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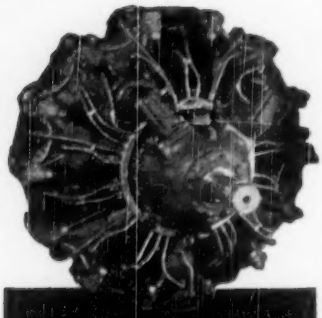

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Aviation Week

Member

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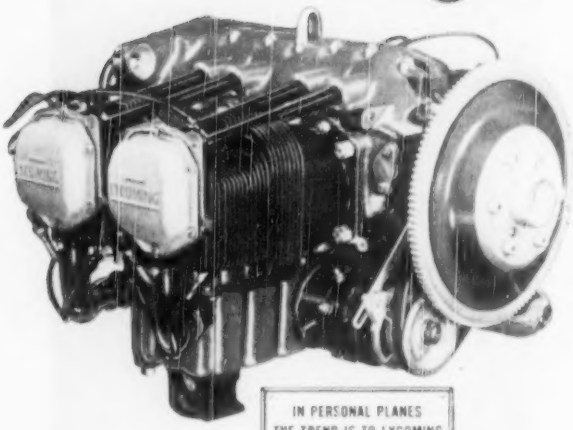

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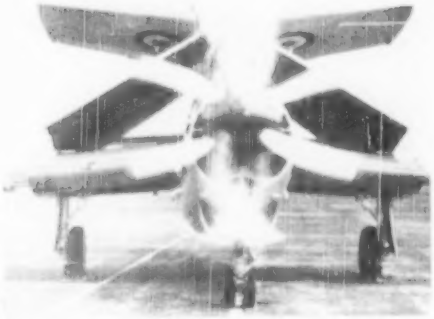

FAIREY 17 TURBOPROP DEMONSTRATES CAPABILITIES

HMS Illustrious is about to feel the impact of the new Fairey 17 anti-sub plane landing on its deck for the first time. The plane is powered by an Armstrong Saddleley Double Mamba turning coaxial propellers. Note the excellent pilot visibility, a major consideration in carrier-based planes. The right-hand photo shows the Fairey's novel wing-folding scheme, each wing breaking in two places to permit stowage aboard cramped carrier quarters. The plane features a retractable "dustbin" radar installation.

BRITISH TURBOPROP FIGHTER

Unusual view of Westland's single-place strike-fighter built for Britain's Royal Navy points up the craft's high-lift wing flaps in extended position. The Wyvern has an Armstrong Saddleley Python turboprop rated at 3670 shp. on takeoff.

NEW S-52 VERSION TESTED

First flight view of Sikorsky's new S-52-2 copter, a commercial version of the S-52-1. The three-seater is powered by a 245-hp. Franklin and has a top speed of about 118 mph. Cruising range is about 413 mi. USAF has designated the craft YH-18A.

SKYKNIGHT BECOMES AIRBORNE

Powerful Douglas F3D Skyknight night fighter takes off at Los Angeles on a test flight. The big carrier-based two-seater is powered by two Westinghouse J34s mounted at either side of the fuselage under the wings. The F3D is in the Gunship class and can operate with over 40,000 ft. The plane incorporates a tunnel escape hatch for emergency exit.

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AVIATION CALENDAR

Aug. 2-13—17th National Soaring Contest, Grand Prairie, Texas.

Aug. 7-18—Special two-week program on high temperature ceramics, Massachusetts Institute of Technology, Cambridge, Mass.

Aug. 7-20—First United States International Trade Fair, Chicago.

Aug. 14-16—National West Coast meeting of the Society of Automotive Engineers, Hotel Biltmore, Los Angeles.

Aug. 19—Tennessee air progress conference, Knoxville.

Aug. 20—California Air Freight Clinic, sponsored by Calif. Aeronautics Commission and Oakland Chamber of Commerce Aviation Committee, Oakland.

Aug. 25-27—Fourth Annual Air Force Association convention, Hotel Statler, Boston.

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough airfield, England.

Sept. 7—Pratt & Whitney distributor operation and maintenance meeting, Pacific Airmotive Corp., Linden, N. J.

Sept. 9-10—Third annual convention of the California Wing of the Air Force Assn., Arrowhead Springs Hotel and Spa near San Bernardino, Calif.

Sept. 10-14—Instrument Society of America instrument conference and national exhibit, the Coliseum, Houston, Tex.

Sept. 12-14—Conference on ground facilities for air transportation, Massachusetts Institute of Technology, Cambridge, Mass.

Sept. 18-22—Fifth national instrument conference and exhibit, Memorial Auditorium, Buffalo, N. Y.

Sept. 19-21—Joint meeting on navigation and electronics, sponsored by the Institute of Navigation, the Radio Technical Commission for Aeronautics and the Radio Technical Commission for Marine Services, Hotel Statler, N. Y. C.

Sept. 25-27—1950 national electronic conference, Edgewater Beach Hotel, Chicago.

Sept. 27-30—Aeronautic meeting and aircraft engineering display, Society of Automotive Engineers, Hotel Biltmore, Los Angeles, Calif.

Sept. 28-30—14th annual convention of International Northwest Aviation Council, Sun Valley, Idaho.

Oct. 12-13—1950 conference on ground management and operations, Max Westheimer Field, North Campus, University of Oklahoma, Norman, Okla.

Oct. 16-20—1950 annual general meeting of the International Air Transport Assn., Fairmont Hotel, San Francisco.

Oct. 24-25—Third Annual Materials Handling Conference, sponsored by Westinghouse Electric Corp., Hotel Statler, Buffalo, N. Y.

Oct. 25-26—Flight Safety Foundation annual Safety Seminar, Denver, Colo.

PICTURE CREDITS

[illegible]

NEWS DIGEST

DOMESTIC

Lockheed R6O Constitution transports are back in service with the Navy Fleet Logistics Wing. To prove their mettle for airlift, one of the big transports carried the entire supporting personnel of Carrier Air Group 7 from Norfolk, Va., to Quonset Point, R. I.

Pan American Airways last week was refused authorization by CAB to operate a system of domestic routes. The Board declared that it denied PanAm's recommendation for service between Boston-New York-Philadelphia-Baltimore-Washington-Miami because such service was not required by the public convenience and necessity. PanAm commented: "... There seems to be a double standard on the subject of competition. Competition continues to be increased on the thin overseas routes ... yet ... Pan American is supposed to be too much competition for the domestic market, which is far larger ..."

Park Air Lines' feeder certificates have been canceled by CAB. In the same action it denied permission to Mid-Continent Airlines to acquire Parks, and instead awarded the north central portion of the Parks route to Mid-Continent and the Mississippi valley and Great Lakes portion to Ozark Airlines. The Board declared that "Parks has had ample chance to establish service ... The interest of the public precludes any further pampering of an air carrier that has repeatedly delayed using its authorization."

American Airlines has purchased four Convair-Liners from Airfleets, Inc., Convair subsidiary. Possible reason: To hedge against further military demands on Airlines' four-engine equipment.

First production de Havilland Comet flew for the first time July 27 at Hatfield, England, one year to the day after the prototype Comet made its maiden flight. In the intervening year the first Comet has flown over 320 hr. And the testing program is due for equip with 500 planes ready for flight now.

Redesignation of three new fighters and a bomber have been announced by USAF, in line with a new simplification policy. Some of the changes have already been noted in AVIATION WEEK. The swept-back Republic YF-96A jet fighter, reportedly favored for escort fighter contracts, is renamed the F-84F. North American's F-95A, with a radar in the nose and airscoop below it, goes back to its original designation of F-86D. Lockheed's F-97 night fighter with the big [illegible] Pratt & Whitney engine with a [illegible] jet, is now renamed the F-94C. [illegible] wing's four-jet version of its swept [illegible] B-47, returns to its original nomenclature of B-47C instead of YB-56A.

Bendix Aviation [illegible]'s new union contract includes a p[illegible]ion plan comparable to the General Motors-UAW plan with a ceiling of $117.50 monthly. The agreement with UAW-CIO covers 12,000 workers in five plants and will be in force for three years with annual wage reopenings. Union leaders say the total economic gains amounted to 19 cents per hour.

First RB-36 conversion from B-36A has been completed by Convair's Fort Worth division. The modifications include replacement of 3000-hp. Wasp Majors with 3500-hp. powerplants, installation of four J-47 turbojet pods and fitting the bomb bay with complex photographic equipment.

First P4M-1 Mercator delivery has been made by Glenn L. Martin Co. to Fleet Squadron VP-21, NATC, Patuxent. The four-engine patrol plane has two nacelles, each housing a P&W R-4360 Wasp Major and an Allison J-33 turbojet in tandem. Nineteen Mercators are on order.

Third International Air Fair of Aero Club of Michigan (Aug. 11-14) has been ordered by CAA to move from Willow Run Airport to Detroit-Wayne County Airport to separate the show from regular traffic at Willow Run.

FINANCIAL

Republic Aviation Corp. reports a six-months' net income of $698,803, after taxes, with sales for the period totaling $29,566,538. Backlog is $43,500,000. For the corresponding period last year, net income was $717,583 on sales of $17,779,202.

Boeing Airplane Co. had net earnings of $5,964,162 for the six-month period ending June 30. Sales and other income came to $140,288,981. Backlog at June 30 came to $319,315,164.

INTERNATIONAL

KLM Royal Dutch Airlines is first commercial airline to get CAA operational approval to use the Sperry Zero Reader. Course installation and flight tests were handled at Lockheed Air Terminal and MacArthur Field.

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Cities Service Cisco Solvent Engine Cleaner
Cities Service Trojan Aero Greases
and Aviation Specialty Products

WHO'S WHERE

In the Front Office

Tom A. Murphy and **Henry Lehse** have been named vice presidents of Republic Aviation Corp. Murphy, in M. [illegible] and working AF representative at Republic, left the service in 1945 to become national aviation sales manager for Reynolds Metals Co. He joined Republic in 1948 and has served as subcontracts manager, purchasing director, factory manager and assistant general manager. Lehse has been sales manager for the company for three and a half years and participated in contracts for the F-84 and other postwar planes.

Robert E. Johnson has been appointed to the new position of director of public relations and advertising and assistant to the president of United Air Lines. He takes over the duties held by **Gail Borden**, who resigned as public relations director. Johnson started his aviation career in 1928 when he joined Boeing.

Richard L. Johnson has been made vice president-finance and **Jess W. Sweetser** has been named vice president-sales for Glenn L. Martin Co. **Daniel A. Pratt** has resigned as a director and vice president-finance. Johnson was assistant to the vice president-comptroller at Douglas Aircraft, going to Martin from Douglas, where with TCA. Sweetser was a member of Curtiss-Wright's Washington staff during World War II, and was active in the Aircraft War Production Council during that period.

Charles H. Colvin, recently named executive vice president of G. M. Giannini & Co., has been placed in charge of all the company's manufacturing and engineering activities on both coasts.

Changes

► Among the Manufacturers—**Philip D. Terry** has been appointed sales engineer for William R. Whittaker Co. ... **Th. D. Bruce Warren** has been given four years leave by the Royal Canadian Air Force to aid in Co. flight test program of Avro Canada CF-100 twin-jet fighter. ... **William G. Cager Jr.** has been made Navy sales manager for Glenn L. Martin Co.

John B. Taylor Jr. has been appointed [illegible] of [illegible] at Ethyl Corp.'s Detroit [illegible]. ... **Frank Wallis** has joined the sales staff of Zenith Plastics Co.

► Among the Airlines—**B. J. Lilbet** has been named European director for Northwest Airlines, succeeding **K. D. McKenzie** who has been transferred to New York. **Kenneth B. Hunger** has been made the [illegible] at Bright Standard.

Honors and Elections

Arthur T. Kelly, Western Air Lines' [illegible] president-[illegible], has been named to the USAF Air [illegible] advisory Air Short Conference for Reserve Policy. ... **Harry W. Stangeron**, Douglas Aircraft [illegible], has been elected to the Controllers Institute of America.

INDUSTRY OBSERVER

► Competition for Allison in the turboprop powerplant field is moving up. Thousands of visitors at the Pratt & Whitney Aircraft 25th anniversary show caught a glimpse of the new PT-2 turboprop rated at more than 5500 equivalent shaft hp. on the nose of a B-17 flying test bed governing for its first flight. Allison's T-40 double turboprop, also rated at 5500 equivalent shaft hp., is the only large American turboprop now flying. But another serious competitor is the Northrop-developed Turbodyne, recently purchased by General Electric (Aviation Week July 31).

► Air conditioning for jet fighters is a growing field into which some of the pressurized cabin equipment people are moving. Fairchild Stratos and Hamilton Standard cabin pressurization department are vying for North American Aviation business. Stratos cools the cockpit of the YF-95A jet fighter. Hamilton Standard is making the air conditioning system for the F-86D (F-95A) jet fighter and will deliver the first unit this summer. Both systems use similar principles, with air as the refrigerant.

► USAF has confirmed the previously reported installation of the big Pratt & Whitney J-48 engine in the complex Lockheed night fighter. Production version will be designated the F-94C (formerly the F-97A). Test experimental F-94 with the J-48 installation was the F-94B.

► A new alternate powerplant installation for Martin's 4-0-4 transport will be recommended for two proposed high-density versions with 48- and 52-passenger cabins. The powerplant is a 2500-hp. version of the Pratt & Whitney R-2800 engine, designated R-2800-CB-17. Earlier 4-0-4s will have the 2400-hp. R-2800-CB-16 powerplants.

► In addition to the Kaman daphne-rotor helicopter contract announced by Navy last week, Sikorsky division of United Aircraft has two contracts out of the same consortium for an undisclosed quantity of the HO5S model, a prototype copter of the S-52.

► Royal Canadian Mounted Police are looking at a three place Canadian-built helicopter, with possible orders for police work in view. Designated model SG Mark VTD, the copter is manufactured by Inter City Airlines and was demonstrated at Dorval Airport to eight RCMP representatives.

► Besides Hamilton Standard's big new eight-blade distribution fuller-propeller, the division is developing a new single-rotation propeller for the Air Force. It's described as the biggest propeller the division has ever built, presumably with a diameter up beyond the 20-ft. mark.

► A new automatic parachute release system announced by Air Materiel Command equipment laboratory contains a timer and an arming element. Both controls are set by the airman before bailout, so that the chute will open automatically if he loses consciousness. It is designed to permit free falls from high altitude bailouts or high-speed plane bailouts, with the automatic opening device taking over at the pre-selected time interval or altitude.

► Australian Commonwealth Aircraft Corp. is now proposing to build the new swept-wing Hawker P-1052 fighter which Tony Wade recently flew from London to Brussels in 21 min. The Australians decided to go for the new model, in place of the Hawker P-1052 jet fighter which had originally been slated for Commonwealth production.

► Senate Armed Services Committee has unanimously approved the bill authorizing transfer of USAF's electronics laboratory from Eatontown, N. J., to Griffiss AFB, Rome, N. Y. Reasons given for move were economy and national security. Sum of $3.4 million will be allocated to complete the transfer.

AVIATION WEEK

VOL. 53, NO. 6

AUGUST 7, 1950

Procurement Goal Pushed to $7.7 Billion

More funds asked for Naval planes, foreign air aid.

By Alexander McSurely

The biggest Naval air arm since World War II was in the making last week to take its place alongside the planned new 60-group Air Force.

In addition, fresh foreign military aid commitments totaling $4 billion were expected to provide a sizable U.S. built fleet of new planes for the free nations of Europe lined up with the U.S. against Soviet aggression.

▶ **More Navy Planes**—A new fund in Navy funds—$930 million and the $4 billion were submitted as additional requests from President Truman, members of the House Appropriations Committee said last week, to be added to the $10.3 billion previously asked (AVIATION WEEK July 31). The grand total of foreign and domestic funds now sought in an emergency fund last week stood at $15.4 billion.

House Appropriations committees last week were holding 12-hour sessions as some trying to get the complicated authorizations of this huge emergency budget request straightened out. Some astute Washington observers thought the bill might even be rammed through both House and Senate by some time this week.

The new Navy fund bring the total allocated for Navy air power in 1951 up to $2.8 billion. This is just over the total of $2.29 billion which had been budgeted for both Air Force and Navy planes in the regular 1951 fiscal year budget bill, now approved by both houses of Congress.

▶ **Foreign Planes**—How much of the foreign aid funds was earmarked for air power had not yet been fixed last week, but it was assumed that at least $1.2 billion of the total foreign aid for 1951 would go for planes. Some Washington sources reported a plan to send at least 1000 U.S. jet fighters to Europe in addition to whatever "mothballed" planes of World War II were reactivated for our allies.

Members of the House Appropriations Committee said the extra Navy funds were needed to start building the Navy's plane strength to a level comparable to that sought for the Air Force.

The Rising Air Power Budget

Still more emergency funds requested by President Truman last week boosted totals for 1951 airpower budget high above the July 24 figures (AVIATION WEEK July 31). Latest additions were $900 million more for Navy aircraft procurement, and an undetermined figure for aircraft procurement for foreign aid, estimated at around $1 billion.

With these additions here is what the 1951 air power budget, including foreign aid, looked like last week (all sums are in billions of dollars):

Total domestic appropriation request	$11.4
Total foreign aid appropriation request	4.0
Total emergency request	15.4

For Procurement

Total previously allotted for new planes (domestic) emergency request	$5.3
New additional Navy funds requested	0.9
New emergency total	6.2
Allocation previously agreed upon by Congress for 1951 Air Force and Navy planes	2.29
Total now budgeted for 1951 (domestic) Military plane procurement	8.49
Amount previously allocated by Congress for planes for foreign aid	0.284
Estimated share of $4 billion new request for foreign aid to go for military planes	1.0
Total estimated for air power in 1951 budget	$7.7

▶ **Ten Big Carriers**—Even before the additional plane funds were added to the Navy's budget, Chairman Carl Vinson of the House Armed Services Committee reported that three big aircraft carriers would be activated, bringing the total to ten, and six small carriers bringing the total number of light carriers to 14. Among the carriers are a new one now nearing completion, and the carrier Essex, now under modernization.

The new proposed 60-group U.S. Air Force status last week was viewed in Washington as the equivalent of an actual 70-group Air Force.

The original 70-group Air Force called for:

- 4 Heavy bomber groups
- 21 Medium and light bomber groups
- 22 Day fighter groups
- 3 All-weather fighter groups
- 6 Strategic reconnaissance groups
- 4 Tactical reconnaissance groups
- 10 Troop carrier groups

In addition to these 70 groups of planes, there were to be 22 separate squadrons to support, plus the 27 National Guard groups.

▶ **Pattern Changed**—Pentagon sources last week indicated, however, that the new 60-group Air Force pattern would be changed considerably from the original 70-group concept. Obviously first step is to expand tactical aviation as previously planned (AVIATION WEEK July 17). But further beefing up of the country's already formidable heavy bomber strength is also in prospect, with orders for more B-36s seen in the cards.

First tangible indications of the way the new emergency funds are to be spent were given last week when the Air Force sent out letters of intent to more than 200 manufacturers. It was

understood that these letters were on a "when-and-if" basis, as far as monies not already allocated by Congress was concerned. But the $1.5 billion already agreed upon by Congress for the regular 1951 Air Force budget was understood to be committed. Tentative allocations were made for planning purposes on the additional $2.7 billion emergency plane fund for the Air Force requested by President Truman.

Some Navy letters of intent also went out to manufacturers last week.

▶ **Top Contractors**—Air Force listed the names of 14 major prime contractors who received what was presumably the bulk of the new plane and engine orders. These included:

Bell Airplane Corp.; Boeing Airplane Co.; Consolidated Vultee Aircraft Corp.; Douglas Aircraft Co.; Fairchild Engine & Airplane Corp.; Lockheed Aircraft Corp.; North American Aviation, Inc.; Northrop Aircraft, Inc.; Piasecki Helicopter Corp.; Republic Aviation Corp.; United Aircraft Corp.; Allison division, General Motors Corp.; General Electric Corp.; and Wright Aeronautical Corp.

Conspicuous by absence on this roster but were Glenn L. Martin Co. and the Curtiss-Wright Airplane Division.

On the basis of the list it was indicated that the following planes could be expected to make up the bulk of the first orders:

Boeing B-47, B-50 and C-97; Consolidated Vultee B-36; Douglas C-124; Fairchild C-119; Lockheed F-80 and F-94; North American F-86 including the F-86D version; Northrop F-89; Piasecki H-21; Republic F-84.

▶ **Trainer Business**—There appeared a strong probability that North American's T-28 trainer and perhaps its B-45 light jet bomber, also might come in for some of the contracts.

Debate-announcement of Navy commitments was still limited to the McDonnell Aircraft Corp. report of Banshee contracts last week, but it was assumed that additional contracts would be let or already had been placed for such planes as the Grumman F9F jet fighter, the Lockheed P2V patrol bomber, Douglas AD and F3D planes and probably for the Chance Vought XF7U and Martin patrol planes.

▶ **4300 Estimate**—The Air Force did not disclose how many planes would be built under the new contracts, but estimates put the total figure around 4300 planes. The old 70-group Air Force program called for a yearly production of 5200 planes to keep an air force of 12,400 modern planes with 4100 reserve planes.

Before the stepup, the 48-group Air Force was on a basis of only 3000 modern planes with 1300 modern planes in reserve, and an annual procurement basis of around 1300 planes.

Britain Ups Aircraft Production

Expanded jet fighter output will account for most of the $280 million additional defense expenditures.

(McGraw-Hill World News)

London—Expanded production of jet fighter aircraft de Havilland Vampire 5s and Gloster Meteor 8s (and some 9s and 10s, which are photo-reconnaissance types) will absorb the biggest share of the $280 million additional outlay for defense equipment now being undertaken by the British government to meet the growing threat of war.

These two basic jet fighter types are already in production for the RAF, and the new defense spending will merely mean increasing the orders already placed.

One estimate has given the prospect additional numbers of planes as 1000. With the overseas sales engines, this would cost an estimated $84 million.

▶ **The Lion's Share**—This was already suggested by Defense Minister Emanuel Shinwell in a speech in the House of Commons. He stated that one of the biggest items in the extra defense outlay would be the provision of additional fighter aircraft to increase the RAF's peacetime strength.

Prime Minister Attlee, supplementing Mr. Shinwell's information, indicated that the RAF would get "rather more than half" of the $280 million. Of the rest, the Army would get a rather larger share than the Navy, he said.

This additional outlay for production and research compares with a maximum of about $70 million for these items in the estimates for this current year.

The RAF's share will also cover, Shinwell said, a speeded-up program of overhauling and putting into combat-readiness the substantial number of Anzio surplus aircraft used in the last war, the expedited reconstruction of the military radar warning chain, and extensions and repairs to certain airfields in the United Kingdom. Some stockpiling of spares and equipment will also be provided for.

Near Capacity—The aircraft companies to be affected by the additional fighter production are de Havilland Aircraft and de Havilland Engine companies, and Gloster Aircraft Co. and Rolls-Royce Ltd., makers of the Derwent turbojet engine for the Meteor.

Both de Havilland Engine and Rolls-Royce are already working at near-capacity, and they may feel some difficulty in further increasing their rate of output. The de Havilland Aircraft Company has of late been shifting all of its Vampire production to a new factory equipped about a year ago at Chester, to make more room at the parent factory at Hatfield for production of the Comet jet airliner.

Only about a quarter of the Chester factory's floor space is now occupied. So if an adequate labor force can be found in that area, there should be ample capacity for more rapid production of the Vampire. English Electric, builders of large numbers of Vam-

CADETS TO EVALUATE NEW T-31

Two improved Fairchild T-31 trainers, like the one above, are participating in a unique evaluation of three new basic trainer types being conducted by USAF students at Randolph AFB, Tex. Groups of pilots will fly each of the three types and then be transferred to single- and twoengine trainers. Their ratings will then be returned back to their basic trainers. Changes in the 320 hp. Lycoming powered T-31 include installation of VHF and ADF radio, wing landing lights which will indicate gear in locked position to tower personnel to prevent wheels-up landings, larger capacity brake system, new instrument lighting, steerable tailwheel of the T-31 type, improved cockpit ventilation and installation of a new blind-flying instrument hood. The plane has a gross weight of 3900 lb. and a top speed of about 170 mph. The basic design built for the Navy and designated XNQ-1, first flew in 1947 and has over 1000 hr. flight time. Note large single-piece sliding canopy.

pace in the later years of the war and in the early post-war years, has now shifted entirely to production of the Canberra twin jet light bomber.)

Gloster Aircraft, a member of the Hawker Siddeley group, is already fully occupied with Meteor production. But a further enlargement of its existing practice of subcontracting manufacture of Meteor components to other firms in the group should make possible the handling of new orders.

At present rates of production, the additional 1000 planes (as estimated) would probably represent about 18 months' production and unless the production rate can be speeded up (which is not too likely in view of the engine bottleneck) the effect of the new orders would be to prolong the existing backlog of production by that amount.

► **Shadow Factories**—Naturally, attention turns to the possibility of using the "shadow factories" erected for munitions production during the recent war. The Government took pains to assure the Opposition that this capacity was still available and that planning for the use of it was well advanced.

In the House of Lords, Viscount Addison, Government Leader, stated: "The shadow factories have not been dispersed yet. They have turned to the manufacture of other things, but . . . the capacity of turnery and the readiness of turnery has never been so great as it is today. The Joint War Production Staff has scheduled this capacity to a very large extent, and in some cases we have given orders to certain firms to keep their war production alive although we were not sure whether we required their products at that time."

Viscount Addison referred, inadvertently, to the manufacture of certain types of aeroplanes. (Firms he probably had in mind were Handley Page, Reading, Ltd., who are producing 14 Marathon transports for British European Airways, despite BEA's reluctance to adopt the type; A. V. Roe & Co. Ltd., Britain's premier bomber builder in the last war, but who have not succeeded in finding any commercial market for their postwar aircraft, and others, including those working on research projects for future aircraft, like Armstrong Whitworth, Bristol, Handley Page, and Vickers Aviation, who have also been pretty occupied with other military production.)

But the conclusion that can be drawn from actually so little is that the expanded production of fighter aircraft will not draw on these shadow factories.

► **Army Needs**—The Army, too, will need additional equipment, as outlined by Mr. Shinwell. Although it has the spare decks of small arms, mortars, field guns and military plus ammunition for them, the Army will need more anti-aircraft guns, increased production of anti-tank weapons, and a considerable number of specialized vehicles.

The reconditioning of stored tanks will be given a high priority, Mr. Shinwell disclosed. The British motor manufacturing industry, which has at present some surplus capacity due to the shortage of sheet steel, could well take on the additional work of military vehicle production. But any such activity would be at the expense of commercial production—and would mean a contraction of exports.

The Navy will speed up the modernization of its existing ships, especially its anti-submarine vessels, make good its deficiencies in naval aviation, armament, and minesweeping equipment and stores, and to a certain extent accelerate the program of new ship construction.

Guided missile research, which Mr. Shinwell admitted still has a good way to go before such weapons can be put into use, will be further stimulated. So will research into counter-measures against mining and submarine attack, radar warning and fighter control equipment, and anti-tank and anti-aircraft devices. Production of such equipment will not begin until "in the course of the next few years."

► **Defense Burden**—The British were spending $2184 million on defense this year—even before the extra commitment was undertaken. This represented 23.6 percent of the total Government expenditure for the year and was equivalent to about 7.6 percent of the total national income, or $42 per head.

Mr. Shinwell cited, for comparison, Russia's probable defense expenditures as being not less than 15 percent of her national income, with which she maintains an army of some 175 active divisions (one-third of which are mechanized) and tank divisions possessing about 25,000 tanks, of which an appreciable number are in immediate readiness in the Soviet Zone of Germany. This means about 2,500,000 men under arms—a figure which could be doubled upon mobilization. This land force is backed up, he said, by about 19,000 military aircraft, including jet fighters and bombers of the latest design, and by considerable naval forces including strong submarine fleets, many of modern design.

The British defense expenditure, according to Mr. Shinwell, "bears comparison to that of any of our allies and friends," but it is not more of a burden than the $18.8 billion the British were spending in 1938. And it represents even less of a defense, since armament demanded twice as many francs as much now as in 1938. A jet fighter costs 130 percent more than a 1938 Hurricane; a modern destroyer costs double what one cost in 1938.

► **How to pay**—The British are firmly determined to pay for this out of increased taxation, and there is shaping up another area for Anglo-American misunderstanding over the opposing views of the suggestion, made by Mr. Acheson in Washington recently that

KAMAN DESIGNS A WINNER

Artist's conception of Kaman Aircraft Corp. (HOK-1, winner of Navy-sponsored design competition between Kaman, Sikorsky, Hiller and Bell. The copter weighs approximately 3500 lb. and can carry a pilot and three passengers. Converted to an aerial ambulance it can carry two stretcher patients and a medical attendant. A single engine drives two meshing rotors. Pitch of the rotor blades can be changed by a small servo-control motor. Note twin vertical fins at the rear of the plane in place of the more familiar anti-torque rotor. Concurrent with the design competition, Navy has just completed evaluation flight tests at the Patuxent Air Test Center of the two-place Kaman K-225 helicopter designed for liaison purposes.

the U. S. allow countries receiving Marshall Aid to use some of their "counterpart funds"—that is, the local currency set aside to match the amount of dollar aid received from the U. S.—to finance defense expenditures.

As far as Britain is concerned, there is seen no reason here for limiting the amount of her defense expenditure to the amount of counterpart funds.

One thing is clear. The U. S. isn't planning to underwrite the cost with dollars. Whatever else may come out of the current meetings in London or the deputies of the North Atlantic Treaty countries, the most that the U. S. is likely to do is to provide some small additional dollar aid for financing the dollar cost of special machine tools and certain critical raw materials required for military production that can only be obtained in dollar areas.

This additional aid would be in most respects exactly like the normal ECA aid, and would be matched by the country in question setting aside an equivalent amount of "counterpart funds," the European regional office of the Mutual Defense Assistance Program told AVIATION WEEK.

Aircraft Re-Hiring Starts Slowly

Employment due to be doubled, but manufacturers move carefully until new orders are confirmed.

About half a million aircraft workers are going to be needed to forge the new U. S. air power ordered by President Truman.

Analysis of a wide range of industry reports and opinions indicates that an increase in the number of aircraft industry workers approximately double the June 1950 figure of 250,000 will be required to do the job.

Under present conditions there appear to be only local manpower supply problems to contend with. But if Selective Service moves on the all-out basis reported as its ultimate mobilization goal, both aviation productive manpower and the vital research and development personnel face the threat of induction.

A representative of the Defense Department serving on an inter-departmental committee in Washington is supporting, reliable sources say, an all-out draft without regard to scientific qualifications or employment, for a full mobilization program.

John F. Victory, executive secretary of the National Advisory Committee for Aeronautics, who is carrying on a vigorous drive for a more enlightened administration of selective service, points out that Britain, Germany and Russia all had effective national service provisions in World War II.

▶ **Scientific Suicide**—Here in the United States," says Victory, "we flirted with scientific suicide. We permitted enrollment in our scientific institutions to be cut to little more than 10 percent of their former level. We adopted a policy that men 26 or younger could serve their nation best only in the fighting forces. Our manpower control thinking was in terms of numbers of men and masses of equipment rather than brains of men and quality of equipment."

Cited also is a statement by Dr. Vannevar Bush, head of the Office of Scientific Research and Development:

"We managed to maintain our strength during the war in spite of the strain and not because of it and it consumed far more time and energy than it should have. A group of enlightened authoritarians with the strong support of Secretary Stimson did somehow wring order out of chaos. But the problem of keeping young scientists in the laboratories was one of the toughest and most irritating problems we faced in the war."

The youth of the nation's top expert researchers on missiles, radar and other electronics developments, which will presumably be vital to national defense in any downward military struggle, is cited by scientific heads as another important reason for freezing in their jobs the key scientists regardless of age.

A serious effect is expected at some aviation companies, because of the large number of reservists and National Guard members among aircraft employees who would be subject to call-up unless special exemptions were made for them.

A draft under the present "oldest-age limit" was expected to have less serious consequences in upbreaking the highly skilled company personnel, especially if it did not include veterans of World War II. Manpower analysts concluded that most of the top skilled aircraft industry personnel were older than 26. Presumably these would be spared and could be counted on to train additional younger men.

▶ **Slow Progress**—AVIATION WEEK polled principal airframe and engine manufacturers who were listed by the USAF as receiving letters of intent committing over $4 billion for planes. They reported slow progress in employment of new personnel.

• **Boeing Airplane Co.** with three plants at Seattle, Renton and Wichita, and with three airplanes to build (C-97, B-50 and B-47), will need "several thousand new employees" to add to its present group of 28,500 workers, a spokesman said.

• **North American Aviation, Inc.,** Los Angeles, reported it is now hiring at the rate of 50 a day, but that manpower requirements are not great at this time and that new workers are being hired to assist to work on the F-51 Mustang reconditioning orders, and for specialized jobs.

• **General Electric Corp.** expects the major additional manpower requirements for its J-47 jet engine production in the Lockland, Ohio, assembly plant, will be problems for GE's 250 subcontractors who make the engines components and ship them to Lockland for assembly. Enlargement of the Lockland assembly crew will be a relatively small percentage of the total additional manpower required. Additional manpower will be needed, in amounts not yet determined, at the Lynn, Mass., GE jet engine plant.

• **Fairchild Engine & Airplane Corp.** is cutting back some furloughed employees and hiring some new ones at specific categories at the Hagerstown, Md., aircraft division, but is building up its force slowly. Specific conditions were reported at its Ranson engine plant.

• **Douglas Aircraft Co.** contemplated no immediate hiring plan for its overhead program of converting Long C-124 transports at Long Beach, Calif., as thereof by letter of intent. Previously Douglas had 80 of the big transports on order. A temporary hiring program for 1200 to 1300 additional employees to recondition B-26 bombers from the mothball fleet was started two weeks ago.

• **Curtiss Wright Corp.** was still awaiting orders used on its contracts but had a small-scale employment program under way to increase production of engines and propellers already called for.

• **Consolidated Vultee Aircraft Corp.,** was expected to hire additional personnel at Ft. Worth and probably at San Diego, but there were no firm figures as to manpower needs. Convair letter of intent called for additional B-36 bombers beyond the 1951 budgetary requirements, indicating a further deep in strategic bomber strength.

• **Republic Aviation Corp.** has recalled about 1,000 employees recently laid off and will add them to a cyclical buildup as needed before starting any larger-scale employment program. Republic's letter of intent calls for F-84 at eighty per, presumably of the F type now in production, and possibly the new swept-wing F-84.

• **United Aircraft Corp.** early last week was still awaiting arrival of its letters of intent before launching any manpower program to increase its present employment.

F-80 CAME HOME after wing lift cable.

MORE wing damage—F-80 got home.

AA SHELL put this hole in stabilizer.

How Jet Planes Survive Battle Damage

U. S. jet aircraft have seen their first combat in Korea and already have answered many questions about how such planes would fare against enemy guns (AVIATION WEEK July 31). Last week graphic evidence of the ruggedness of Lockheed F-80s came to hand: the photographs on this page, and the following report of the Lockheed service representative, Noble G. Heuter, in Korea, which was especially cleared for AVIATION WEEK. Some parts of Heuter's report were cut out by Air Force censors for security reasons.

We have lost three F-80Cs due to enemy action without the loss of a single pilot.

One aircraft blew up on ammunition train and got caught in the explosion. The pilot pulled 15-G trying to avoid debris but came back with holes in the leading edge, elevator and many scars from fragments.

Another F-80 flew into a flap cable, strung between two poles, lost both tip tanks and wing tips had two 40-mm. shells then his nose section shattering the wind shield and bending the barrel so the funnel gun so that it stuck out at right angles to the original position cleared off approximately fourteen inches of the vertical fin and rudder. The pilot then climbed to 15,000 ft. and bailed out. He claimed the controls were a little sloppy and was afraid to straight fore control so checked it out and while he could.

Another F-80C ran into another cable tower. The cable cleared off his pitot tube, cut into the leading edge of the forward gas tank, both tip tanks off, sheared the left wing tips off plus 20 in. of the fuselage. The pilot climbed to 50,000 ft. and came home. He landed downwind at 170 mph. with the stick hard over and the left left not stalled to a stop. Then turned up to the line under his own power.

Another F-80C was hit from beneath, the shell entering the aft section at station 332 tearing a hole in the tail pipe two inches square where it entered and another hole five inches square where it came out. The shell then tore part of bulkhead 376, finally blowing a hole in the stabilizer to fin fillet approximately four inches square. The pilot said the aircraft handled normally. Damage from heat was negligible. Two other F-80Cs have had single shells pierce the fuselage aft. The pilots claimed the engine operated normally. The airframe around the area was slightly blackened.

I hope to send along pictures of some of the battle damage if batch gets gives me an OK.

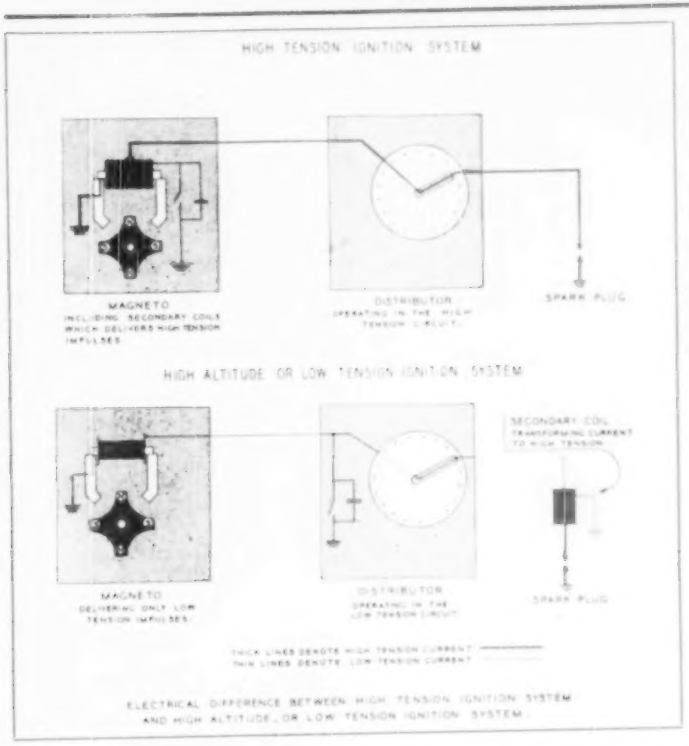
The 267-gal. tanks are made from three center sections from Ketcher tanks and the existing front & Bosch tank. Four baffles are bolted to the section bulkheads to prevent sloshing. An extension rod approximately 44 in. long is used to hold the sections.

Now they are hanging four rockets in addition to the 267-gal. tanks.

They have been keeping me going night and day . . . but will make a report of a more technical nature shortly. Enthusiasm for the F-80 highly complimentary. What a job they are doing . . . job that they were never designed to do—that is, loss level strafing three to four hundred miles away from their base. The beating they are taking with every pilot wearing a G-suit is remarkable.

SHELL through tailpipe caused no fire.

LARGER WING TANK was improvised by adding extra center sections.



ELECTRICAL DIFFERENCE BETWEEN HIGH TENSION IGNITION SYSTEM AND HIGH ALTITUDE, OR LOW TENSION IGNITION SYSTEM

Low Tension System Gaining Favor

American buys $1 million worth of Bendix Scintilla equipment for all R-2800s; increased plug life seen.

By George L. Christian

With a $1-million order in its pocket from American Airlines for low-tension ignition systems (AVIATION WEEK July 3), Bendix Scintilla has catapulted this equipment into the "big time" of ignition business.

When AA's conversion of more than 400 engines is completed, approximately three-quarters of all scheduled airline R-2800 engines will be so equipped. Eastern Air Lines and TWA engineers have confirmed that the system will be installed in their recently ordered Martin 404s.

Although the low-tension system has seen considerable airline service on such aircraft as DC-6s, Constellations, Convair 240s and the SAAB 90A2, American's order is significant because it represents a fleet-wide conversion to a single ignition system and because of impressive results obtained during extensive service tests. The airline's conversion costs, Bendix says, will run to another $1 million.

▶ **Prolonged Plug Life**—According to Bendix' Scintilla Magneto division, at Sidney, N. Y., the following plug times were obtained on low tension-equipped engines in tests conducted during the last year:

AIRLINE	SPARKPLUG	TIME
AA	Champion R378-1	804 hr.
AA	Champion R378-1	812 hr.
Panagra	Champion R378-1	994 hr.
Panagra	B. G. BR-100-2	858 hr.
EAL	Champion R378-1	833 hr.

NOTE: The EAL tests were on a Constellation with R-3350 BD1 engines; all the others were on DC-6s with R-2800 engines.

No plug was removed for malfunctioning, Scintilla claims, and the average erosion rate for the tests was .0014-.0015 in./100 hr. The division reiterates that AA's DC-6s averaged twice as many landings and takeoffs as Panagra's.

"Compare these figures with average high tension data for the same engine which show sparkplug removal at approximately 300 hr. and erosion rates of .003-.005 in./100 hr.," says a Scintilla engineer, "and you can understand one of American's major reasons for changing over."

R-2800 engine operators may expect to change plugs every 600 hr., or once per engine change, he added, because the low tension system reduces erosion rate by as much as 65 percent and also aids materially in firing partially fouled plugs.

▶ **Altitude Test**—Scintilla cites an incident during the test of the first low tension ignition system in a pressure chamber. The operator inadvertently increased the chamber altitude to 60,000 ft. instead of the intended 30,000 ft. The low tension system continued to fire perfectly. This test has been repeated on each system developed to date. Yet, a jump gap type high tension distributor will spark up to 10 in. at that altitude, says the company.

When a pilot had a rough engine in earlier days, chances were he could reach forward and find a dead cylinder by feel. Today complex instruments are required. Engine vibration had little effect on a Curtiss Jenny's wooden, fixed-pitch prop. Dead cylinders and the vibration they cause in modern engines have posed serious design problems to manufacturers of today's constant speed, controllable pitch propellers.

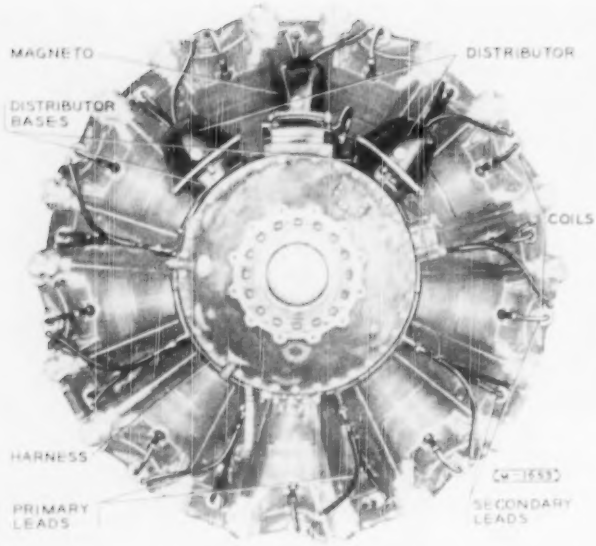
Primary requirements of an ignition system for current reciprocating engine aircraft, according to Scintilla, are:

- **Electro-mechanical** design simplification.
- **Reduction** of sparkplug erosion.
- **Increased ability** to fire partially fouled plugs.

▶ **First Low Tension System**—Scintilla first tackled the problem of developing low tension ignition systems in 1938 for use on large, stationary, internal combustion engines.

The company devised the "LA" system of ignition. The magneto generated low tension current which was fed to the distributor and leads. A transformer adjacent to each plug converted it to high tension current.

It soon became evident that this type of ignition equipment was particularly adaptable to aircraft engines. This idea was given sudden stimulus by the behavior of aircraft engines during the Battle of Britain, where combat operating altitudes first reached 30,000 ft. Much engine malfunctioning was traced



FRONT VIEW of R-2800 incorporating low tension system. Note coils adjacent to plugs.

to ignite spark behavior in the distributor.

By 1941 Scintilla gave priority to two projects in an effort to solve this difficulty.

• **Supercharging** the distributor compartment. This was done and proved successful.

• **Developing a low tension** ignition system. Once the full potential of this study was realized, the company decided to increase its efforts to create a commercial aircraft application. Up to now relative simplicity of the system, its ability to reduce plug erosion and reduce susceptibility to plug fouling.

By 1942, Scintilla had delivered the first two systems to the Wright Aeronautical Corp. for evaluation—one for the R-1820, the other for the R-1750 engine.

During the next year, Pratt & Whitney received a system for the R-2800. PAW and CAA approvals for this engine were not received until 1947, and USAF approval came through in 1949.

Currently, the company is also making low tension equipment for the PAW R-2180E and R-4360C.

▶ **Ignition System Classification**—Scintilla recommends that ignition systems be classified. The following was cited as a simple method:

• **High Tension Systems**—Distribution at more than 1000 v.

(a) Audio frequency.

(b) High frequency.

• **Low Tension Systems**—Distribution at less than 1000 v.

(a) Audio frequency.

(b) High frequency.

Of these four classifications, Scintilla feels that the low tension, audio frequency system offers the maximum reliability in the engine when considering overall system and plug life, ultimate performance, and overall maintenance.

▶ **Low Tension Benefits**—Robert Boyer, Scintilla senior sales engineer, has compiled a number of analyses which purportedly show that a low tension ignition will:

• **Sparkplug erosion rate** by as much as 65.71 percent.

• **Off-schedule ignition** unit removal rate by up to 50 percent.

• **Airlines delays**, due to ignition troubles, possibly 50 percent.

• **Ratio of unscheduled** sparkplug removals per 1000 hr. to scheduled plug removal time by as much as 45 percent.

Other advantages claimed are increased flight ceiling at altitude, and a weight saving of 10 lb. per engine.

An improvement of the R-2800 low tension system is given the equivalent of 1 to 2 spindle magnetos instead of one. The single magneto offers less radio noise.

▶ **Low Tension Theory**—Boyer said that the removal of the secondary coil from the magneto and the transformation of voltage adjacent to the sparkplug brought about these advantages. Since the capacitance of the secondary circuit is greatly reduced, the energy discharged across the electrode gap is decreased.

The three factors controlling spark plug erosion are heat, time and the accompanying electrical force (energy). These are all diminished, he claimed, with low tension.

Minimum leakage resistance is the gage of the ability of an ignition system to fire a partially fouled sparkplug. It will vary with the frequency or rate of rise of voltage on the center electrode. The frequency is controlled mainly by the electrical constants of the secondary circuit—inductance in the secondary coil and capacitance. Since these are both greatly reduced in low tension, rate of voltage rise is increased and minimum leakage resistance is reduced 64 percent.

Boyer added that this was also true for high frequency ignition, even to a greater degree, but claimed an advantage in the lower cost of plugs for the low tension system.

▶ **Outlook**—Scintilla sees a bright future for its low tension system and claims:

• **Dollars and cents** advantage of the system can mean conversion and reimbursement of its low initial cost.

• **Industry acceptance** of the principle of low vs. high tension ignition is growing.

• **Continued military use** of reciprocating engine aircraft now seems indicated, on which low tension systems will be used.

• **Rapid development** is taking place of low tension ignition equipment for engines for non-aviation purposes.

The division presently is engaged in the development and manufacture of aircraft and missile ignition systems, rocket motor and reciprocating engine ignition analyzers and switches, radio interference filters, electrical connectors and related products. New applications include industrial engines, jeeps and outboard motors.

Redifon Will Make Dehmel Simulators

Dehmel flight simulators will soon be built in England. Roy L. Hurley, president of the Curtiss-Wright Corp., Caldwell, N. J., has announced.

An international licensing agreement, negotiated through Curtiss-Wright's Propeller division, allows Redifon, Ltd., London to produce flight simulators for American and European-designed aircraft. They will be built under patents held by the American company.

"The Redifon agreement has important economic and military significance," Hurley said. "It was negotiated in accordance with the stated policies of the U. S. government to build up European defenses and to aid self-contained countries to become self-sufficient by enabling them to produce for themselves equipment they require at the lowest possible expenditure of dollars."

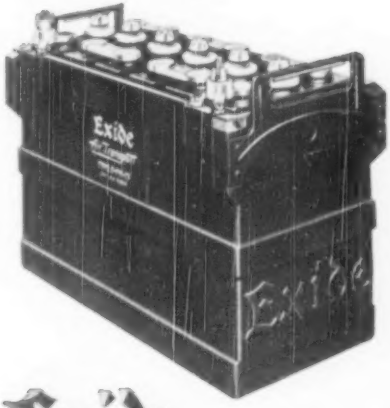
Curtiss-Wright says the first simulator to be built by Redifon will be for the Boeing 377 for delivery to British Overseas Airways Corp.

When emergency power is needed your batteries *MUST BE GOOD*

Nothing less than *complete dependability* is good enough for your aircraft batteries. They must be *ready to respond instantly* when needed . . . *able to handle heavy power loads* momentarily and *deliver every time* they're called upon. You'll find those characteristics in all Exide Aircraft Batteries—the very best that long experience, engineering knowledge and manufacturing skill can produce.

The outstanding performance of Exide Aircraft Batteries is being demonstrated daily in commercial, government and personal planes of every kind. Wherever used, you can always count on your Exide Aircraft Batteries for dependability, long life and low cost maintenance.

1888 DEPENDABLE BATTERIES FOR 62 YEARS 1950



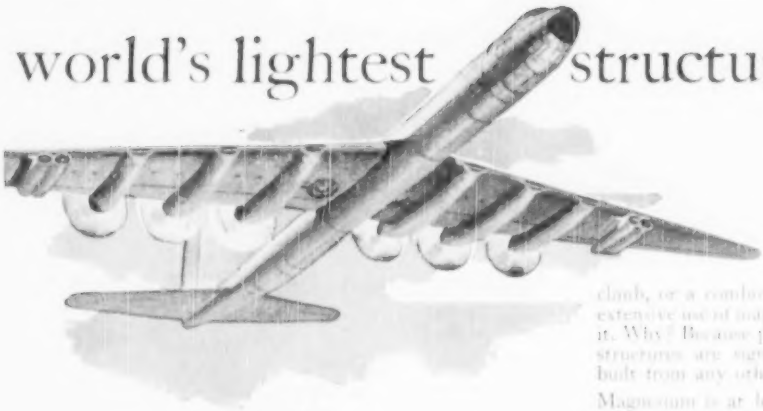
Exide AIRCRAFT BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

Designers and engineers have found that improved performance always results from increased use of Dow

MAGNESIUM

world's lightest structural metal!



Every pound of unnecessary weight stripped from a plane has its effect in increased performance. Whether performance is measured in terms of speed, range, load, rate of climb, or a combination of these factors, more extensive use of magnesium will serve to improve it. Why? Because properly designed magnesium structures are significantly lighter than those built from any other material.

Magnesium is at least 33⅓% lighter than any other structural metal, yet for all this lightness, it is remarkably strong and versatile. Whether you're designing aircraft equipment, or working on the design of the aircraft itself, think first of magnesium! It is the most logical material when lightness is important. For technical information about magnesium write to Dow. To see case studies of successful magnesium applications, ask for your free copy of "How Magnesium Pays".

For ultimate light weight and strength use MAGNESIUM

Formed magnesium "waffle grids" like that pictured above were used on the entire wing trailing edge and some portions of the fixed control surfaces of the B-36. To keep its weight at a minimum, over 8000 lbs. of light, strong magnesium sheet and extrusions were designed into the structure of this giant aircraft—proof of the value of the lightest structural metal in the world.

MAGNESIUM DIVISION—DEPT. MG-78

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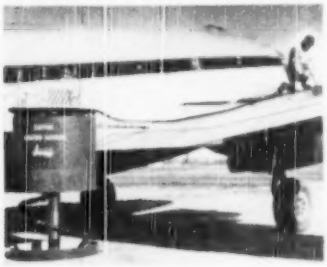


Apron Refueler

A fresh approach to aircraft refueling—doing away with trucks and departing from the usual conception of pit refueling—is exhibited in the Aero Cell, a telescopic refueler recently developed by the Wattpar Corp., New York.

This compact, relatively small installation contains many convenient features aimed at making aircraft refueling more efficient. It already has created considerable interest in airport circles. The Port of New York Authority now is studying one installed at Teterboro Airport, New Jersey.

Manufacturer of the Aero Cell is the Combustion Equipment division of Todd Shipyards Corp., 81-16 Forty-Fifth Ave., Elmhurst, Queens, L. I., N. Y. Wattpar is responsible for engineering and sales.

The Aero Cell is a completely self-contained mechanism, except for underground supply lines feeding it electrical current, fuel and fire extinguishing fluid. It consists mainly of a cylindrical steel cell perched on a hydraulic lifting jack. By flipping a dead man electric switch, the cell can be extended to a maximum height of 17½ ft. in less than a minute, or can be retracted into the ground flush with the apron surface.

An inner cylinder at the top of the device is strong enough to support the weight of the heaviest commercial craft now used, according to Todd. The cell, about 5 ft. in diameter and 7 ft. high, contains fuel hose, ground wire, meter, fueling and defueling controls, CO_2 hose and nozzle, small walk-way and protective siding which automatically extends and retracts as the cell is raised or lowered.

These units are designed to be installed in pairs on the apron, so that when the plane taxies into position a cell will be located aft of each wing. To operate, an attendant steps on the flush cover of the refueler, opens a switch cover and raises it to a height somewhat above that of the wing trailing edge. He then projects the walk-way which extends to a point several inches above the wing structure and past the trailing edge. The walk-way does not have to touch the wing at any point, but provides an easy step-down to the wing surface.

To refuel, the operator opens the access cover to the hose compartment in the cell, proves a refueling switch and pulls the hose and nozzle over the walk-way to the wing tank filler opening.

Todd feels standard, quantity-produced Aero Cell units would cost less and be more efficient than underground refueling pits built specially for each airport—each time by a different contractor. An advantage over regular pits is that the hose is delivered practically on the spot for upper wing surface refueling, removing the need for manually lifting and dragging it up and over the leading or trailing edge of the wing. For underwing fueling, the hose can be pulled out with the cell remaining flush in the ground.

Wattpar says Aero Cells can be provided with special equipment to boost fuel delivery well over 200 gpm.

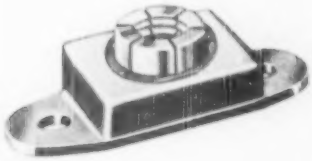
Big Plane Aid

A new addition to the family of aircraft ground handling equipment is the AH2 hoist developed by Wells All Steel Products, 10717 Chandler Blvd., N. Hollywood, Calif. This device is designed for maintenance operations around large planes. It has a working height of more than 30 ft. and a 10,000 lift capacity.

A prime advantage claimed by the maker is that it can be rapidly disassembled into 10 small sections and outweighted to a new location. The hoist is said to be highly maneuverable, permitting it to be towed quickly to a new position or moved a fraction of an inch for installation problems requiring accurate and close positioning. It is particularly useful for installing engines, gun turrets, tail sections and similar work.

Manually and electrically operated versions of the hoist are available. Lift speed by hand is 4 ft./min. and about 6 ft./min. when the winch is electrically driven either on 24-v.d.c. or 110/220/440-v.a.c. current.

The unit moves on a triangular-shaped structural base, mounting ball-bearing action, solid rubber tires. Leveling jacks are provided for overcoming field irregularities. Net weight of hoist is 5400 lb.



Lightweight Nutplate

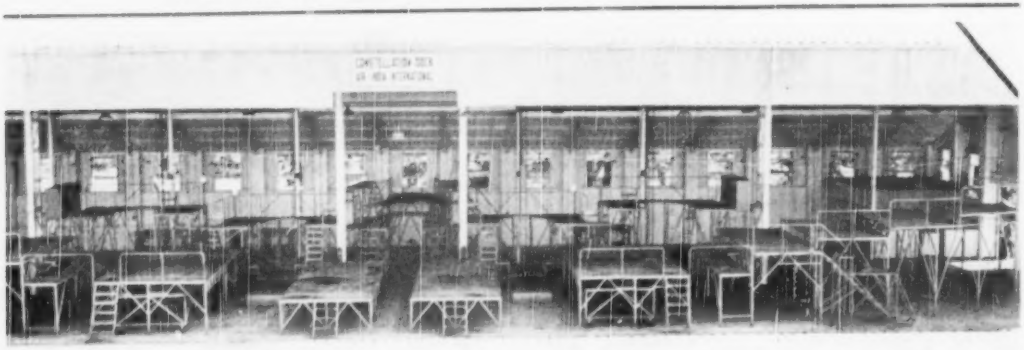
Floating-type, self-locking nut plate, made by Nutt-Shel Co., 517 East 2nd St., Los Angeles, Calif., is lightweight part conforming to Specifications AN-N-5 and -10. Unit has same dimensions as AN366D and AN362D stationary nut plates and is designed to withstand high axial loads and temperatures up to 250F. of the nut is approximately .6 in. from center in all directions.

Replaces Templates

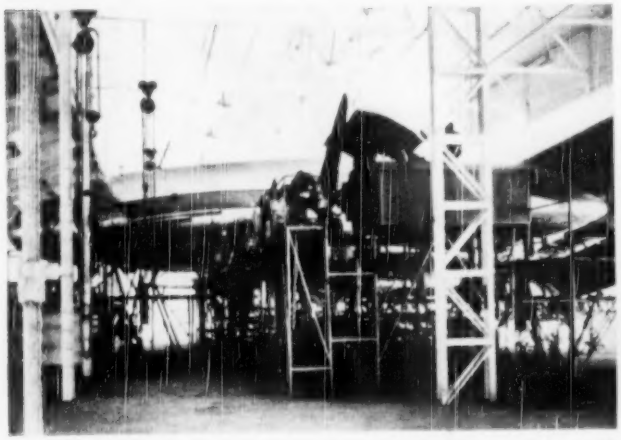
A new instrument designed to transfer on transparent paper the exact contour of a model, doing away with the need for cutting and fitting templates, is being marketed by Inter-Lakes Engineering Co., 4343 Bellevue Ave., Detroit 7, Mich.

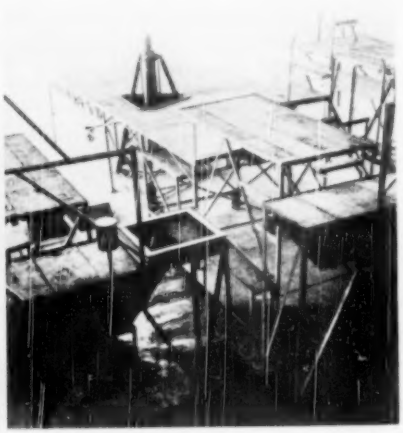
Called the "Duplagraph," the device is said by its maker to be suitable for securing contour readings in forming dies which frequently cannot be checked with ordinary templates. The firm says it also can be used to show accurately the amount of spring-back and warp in a jet blade, a stamping die and other parts.

The device reportedly will speed inspection procedures in manufacture of products which require close following of models. It gives cross-section lines relative to each other, usually on vellum, which are checked against the draft or layout. The firm points out this results in a full contour check as compared with only a spot dimensional check by former methods.



GENERAL VIEW shows work platform of the maintenance dock, homemade by Air-India International engineering personnel.





CONNIE is undergoing routine inspection at Bombay International Airport. No. 2 engine platform (right) has wing jacks in position.

Air-India Maintenance Simplified

Work dock for servicing company's Constellations incorporates many safety and timesaving features.

Bombay—A new work dock designed to take some of the work out of maintenance and overhaul of Air-India International Ltd.'s Constellations has recently been completed here by the Eastern Hemisphere carrier.

The dock consists of a series of work platforms arranged to give convenient access to any part of the aircraft forward of the main cabin door. Safety rails surround all the platforms. Warning lights and buzzers have been incorporated to guide those working on the planes and keep them out of the way of whirling propellers.

▶ **Quick Entry**—The aircraft is moved into position by a tractor tugging a cable attached to the plane's nose-wheel strut. An electrically driven winch will be incorporated in the system soon.

The entire docking operation takes about five minutes. It is controlled by one man working "stop and go" lights visible to the tractor driver and the person at the plane's brakes. Main wheel chocks on the ground stop the plane when it has entered the dock completely. The chocks are removable to permit retraction of landing gear and work on the wheels.

These design features are calculated to make maintenance work quicker.

- **Platform flaps** which can be lowered out of the way to permit free rotation of any of the propellers.
- **Monorail** over each engine carrying three-ton block and tackle for removing and installing powerplants and propellers.
- **Built-in jacks**, hydraulically operated, for lifting the plane off the ground.
- **Direct-current generator** with voltage regulation for providing 24-v. dc supply to operate aircraft services independently of the plane's batteries.
- **Mobile hydraulic rig** for ground-checking hydraulic services.
- **Propeller dollies**, on which props can be threaded after removal by means of overhead gantry for convenient storage until needed.

▶ **Home-Grown**—The dock, except for the hangar in which it is housed, was designed and built entirely by Air India engineering personnel.

Newer Look

British rework of old designs gives new types at minimum cost.

(*McGraw-Hill World News*)

London—British aircraft engineers have been busy giving some of their old designs the New Look—thus getting up-to-date types with a minimum strain on the budget. The refurbished craft are by Vickers (the VC-3 transport), Gloster (F. R. 9 and P. R. 10 photo Meteors) and Scottish Aviation (Pioneer communications plane).

The Vickers V.C. 3 planned as a Viking replacement is still in the design project stage and no decision has yet been made to produce a prototype. It incorporates the tricycle landing gear used on the Varsity RAF bomber crew trainer now in quantity production. The V.C. 3 would carry 27 passengers at a cruising speed of 185 knots over stages up to 1375 nautical mi. A crew of two and steward would be standard.

The V.C. 3 would presumably be powered with two Bristol Hercules of approximately 2000 hp. each.

▶ **Meteor Development**—Gloster's continued development of the basic Meteor design has resulted in two photographic reconnaissance versions:

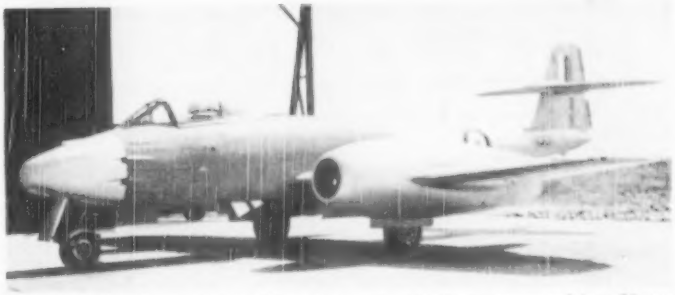
• **F. R. 9** has three camera mounts in addition to four 20-mm. cannon. The nose has been slightly lengthened and fitted with a flat slightly down-angled window for one camera position. Two other windows in the side of the nose permit oblique photography.

• **P. R. 10** is an unarmed high-altitude camera plane having the F. R. 9's nose plus additional camera mounts in the rear of the fuselage. For optimum high-altitude performance the Meteor 3's longer span wings are fitted to the P. R. 10, as is the Meteor 4's tail assembly. Cockpit and ejector seat are as in the Mk. 8.

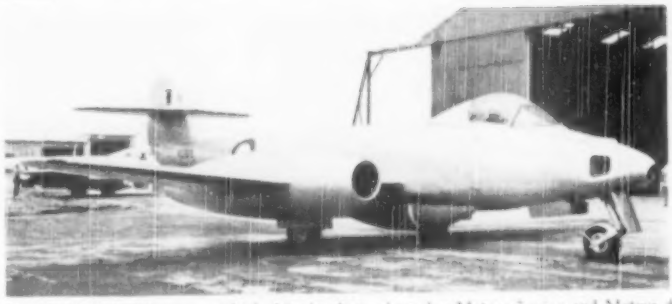
▶ **New Pioneer**—Scottish Aviation's new Pioneer is a five-place commercial version of the A.4/45 liaison plane developed for the RAF several years back. Instead of the 250-hp. DH Gipsy Queen fitted to the A.4/45, the Pioneer is now powered by an Alvis Leonides nine-cylinder radial power plant of 520 hp. Top speed is given as 162 mph., cruising speed as 150 mph. and range as 400 mi. at 120 mph. Service ceiling is 23,000 ft. Takeoff run is said to be 80 yd. and landing run 66 yd.

During flight trials at Prestwick, Scotland, the Pioneer is reported to have repeatedly taken off within the width of the runway. This performance is made possible by the use of full-span slots and Fowler and split flaps reaching over 50 percent of the wing span.

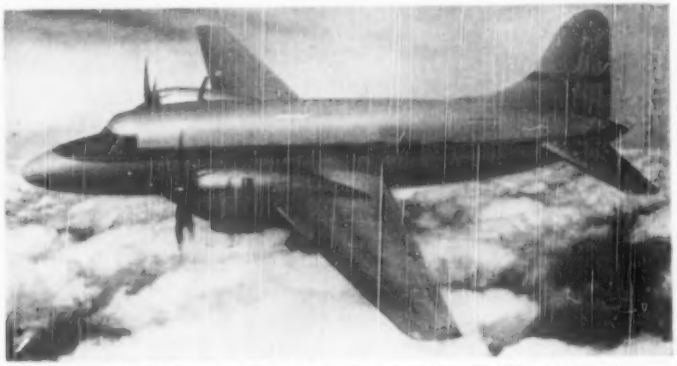
The Pioneer is now undergoing flight trials for an airworthiness certificate and is expected to go into service in Australia following approval.



F. R. 9, developed from Gloster Meteor design, mounts three cameras and four 20-mm. cannon.



METEOR P. R. 10, unarmed high-altitude photo plane, has Meteor 3 wing and Meteor 4 tail.



VICKERS VC-3, shown here in artist's drawing, may replace the Viking transport.

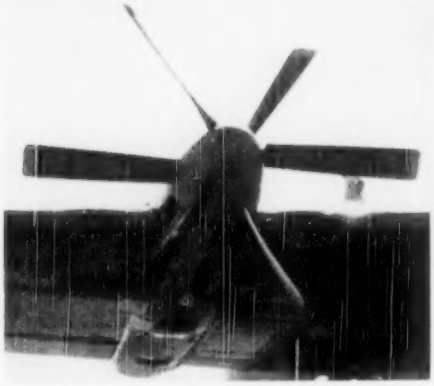
Bulgarian-Soviet Air Group Formed

(*McGraw-Hill World News*)

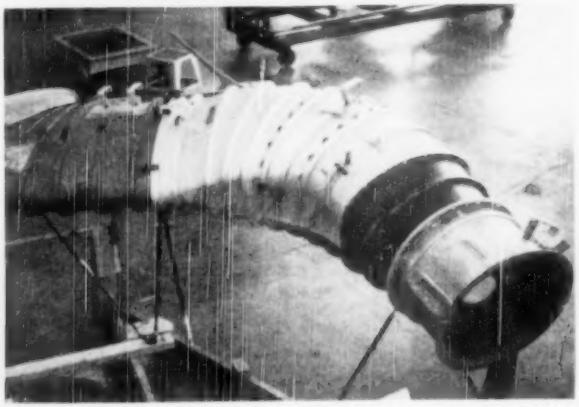
Sofia—A Bulgarian-Soviet Air Company has been established here to run Bulgaria's domestic airways. Succeeding the former Bulgarian Air Communications, the new company is operating twice Black Sea routes.

It is reported that the new company is a 50-50 partnership between the Bulgarians and the Russians. Two-engine Soviet planes, described as "noiseless," with 20-passenger capacity are operating on the runs (about 450 kilometers between Sofia and the Black Sea).

Close relations are being maintained between the Bulgarian line and the Czechoslovak Airways, which operate the three-weekly line Sofia-Prague via Budapest, and with the Soviet Airways, which run between Sofia and Moscow.

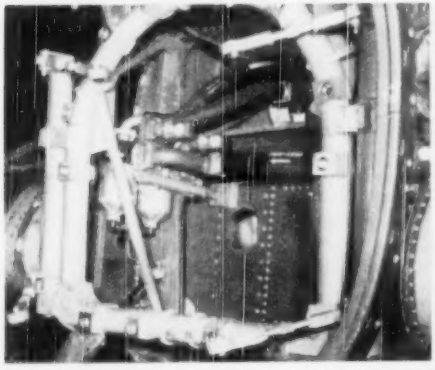


CLEAN nacelle fairing has high-speed oil cooler inlet. Engine intakes are behind propeller pressure peak.

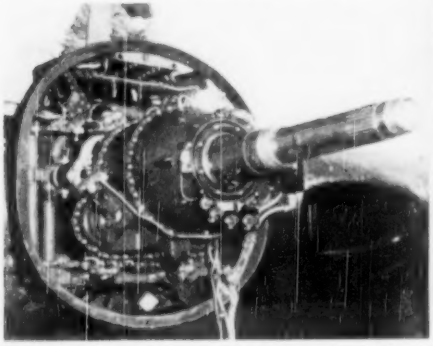


DUCT for engine air, one of eight units, splits to go around drive shaft, returning to a round section at the compressor face, concentric with shaft.

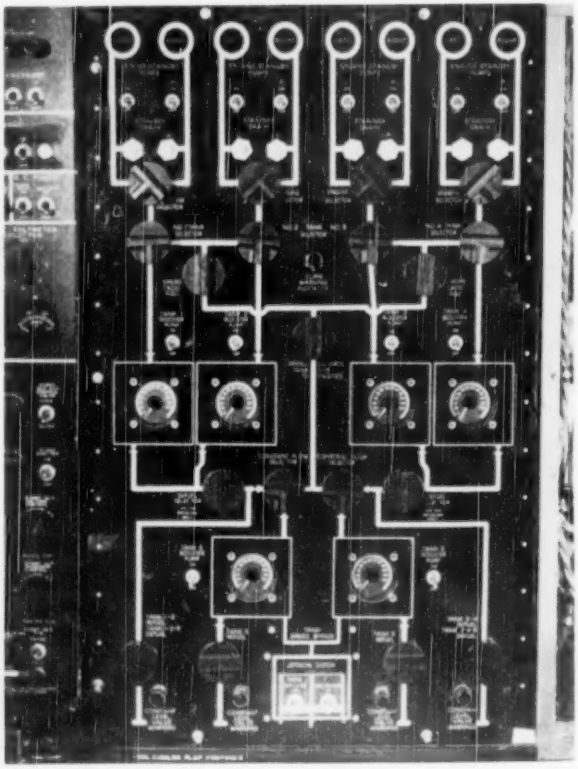
Turboprop Installation Design Highlights



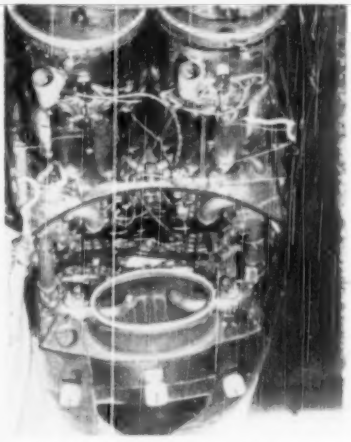
SUPPORT structure for gear box, showing the paired connection bases for six Dynafocal mountings.



GEAR BOX installation, with four mounts visible.



FUEL controls and system schematic, with quantity gages in "tank" squares.



PAIRED POWER UNITS of the compact Allison XT40-A-4 turboprop, seen from the bottom, looking forward. Behind oil cooler rear face are bleed-air augmentors to improve on-the-water cooling.

on XP5Y-1

First details of Convair's XP5Y-1 powerplant installation (Allison XT-40) point up some of the problems to be faced by designers of turboprop aircraft.

The accompanying photos and some powerplant data were presented by F. H. Sharp of Consolidated Vultee Aircraft Corp., in a paper "Current Turbo-Prop Power Plant Installations," at the recent annual summer meeting of the Institute of the Aeronautical Sciences in Los Angeles.

Convair's giant flying boat was designed to be self-sufficient in advance areas and be able to operate from unprepared bases.

To that end, the entire powerplant can be maintained and serviced from the wing. Auxiliaries can be mounted or demounted with special hoisting equipment carried aboard the craft.

Much attention has been given to getting the necessary air into the engine and cooler in the most efficient manner. Compression intakes are located in the wing leading edge, within the propeller disk, for maximum ram effect.

Ram air passes with a minimum of disturbance through a split duct (which divides around the drive shaft) to the engine inlet.

The oil cooler, along below the engine inlets, is supplied with cooling air from what appears to be an NACA high-speed type of inlet. Because the cooling problem is amplified when the boat is on the water, pressure air is bled from the engine compressor section into an ejector just downstream of the oil cooler.

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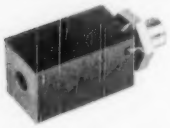
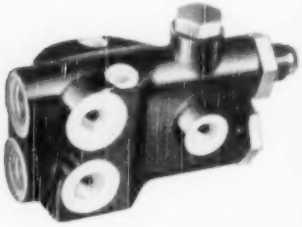
DRAIN VALVE

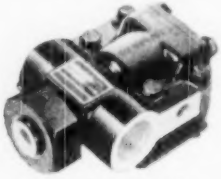


STRAIGHT DRIP VALVE

ANGLE DRAIN VALVE



DOUBLE DRIP VALVE



FUEL DUMP VALVE

FLUID INJECTION NOZZLE

DOUBLE SWING CHECK VALVE

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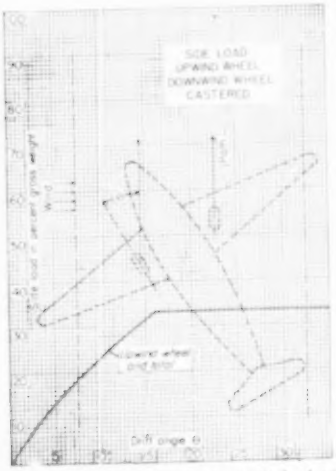
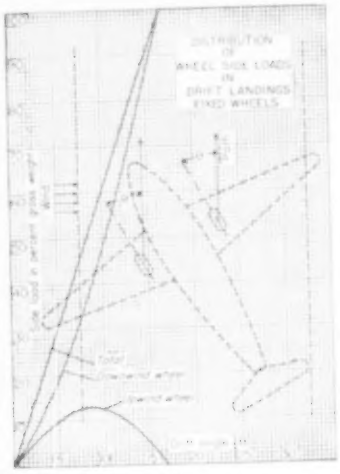
Goodyear crosswind gear on T-6 trainer has 30 deg. caster either side of center.





Charts show variation of wheel side load with drift for Geisse swiveling gear.

Swivel Gear Interest Quickens

New developments in progress of swiveling landing gear promise to create additional aviation interest in this means of making crosswind landings safe.

• **John H. Geisse**, former CAA consultant, has brought out his own new simplified type of swiveling gear. He estimates it can be put on an airplane as original equipment at cost to manufacturer for labor and material of only $15 a unit.

• **Goodyear Aircraft Corp.** has announced sale of its first crosswind wheels to the Air Force. Air Materiel Command will install seven of the sets on T-6 trainers for evaluation in pilot training.

• **Capital Airlines** already has taken delivery of its first Douglas Super DC-3 with Goodyear crosswind wheels, and will put it and two sister ships on Southern routes for the first commercial transport service experience on the crosswind gear in this country.

Difference in performance between the Geisse gear and others developed under CAA sponsorship, including the Goodyear crosswind wheels, lies principally in the restriction preventing the wheels from swiveling inward. They will turn out, but not in. Geisse studied the problem of side loads on the wheels and determined that this restriction was an added safety feature that was desirable.

He has selected a maximum side load of about 1/4 the weight of the airplane as a ratio for good performance and adequate taxi control.

The former CAA consultant brought out his new design in an effort to persuade aircraft manufacturers to build it themselves and install it on their own planes as original equipment, and has no immediate plans to manufacture it himself. He is negotiating for its adoption as original equipment with such firms as Piper and Cessna, and is also discussing its possible use with the military services.

Geisse explains the theory of his new device like this.

It is essential that the main wheels be capable of generating some side force. Otherwise only the propeller thrust would control the path while on the ground.

Caster restraints in the form of cams, springs or hydraulic units have been used with castered mainwheels to enable the wheels to provide this side force. With such devices the sideload is equally distributed between the two main wheels. In the Geisse gear, the downwind wheel caters out without restraint. The desired side load is obtained entirely from the upwind wheel which cannot turn inward, because of inward castering stops.

Parts used in a Piper Clipper installation of the Geisse gear included: A caster spindle made integral with the wheel axle and provided with a notched collar to stop inward castering; a spindle bearing connected to the Piper landing gear strut; a split ring to hold the spindle in its bearing; a light torsion spring to hold the wheel against the stop in the air, and a cap to anchor one end of the spring and hold the split ring in place.

The spindle bearing was sloped pointing toward the ground, ahead of the wheel. This arrangement would cause a tendency for the wheels to turn in, without the inward castering stops. No shimmy dampers are provided, and they are apparently unnecessary due to the fact that the wheels will not caster through center.

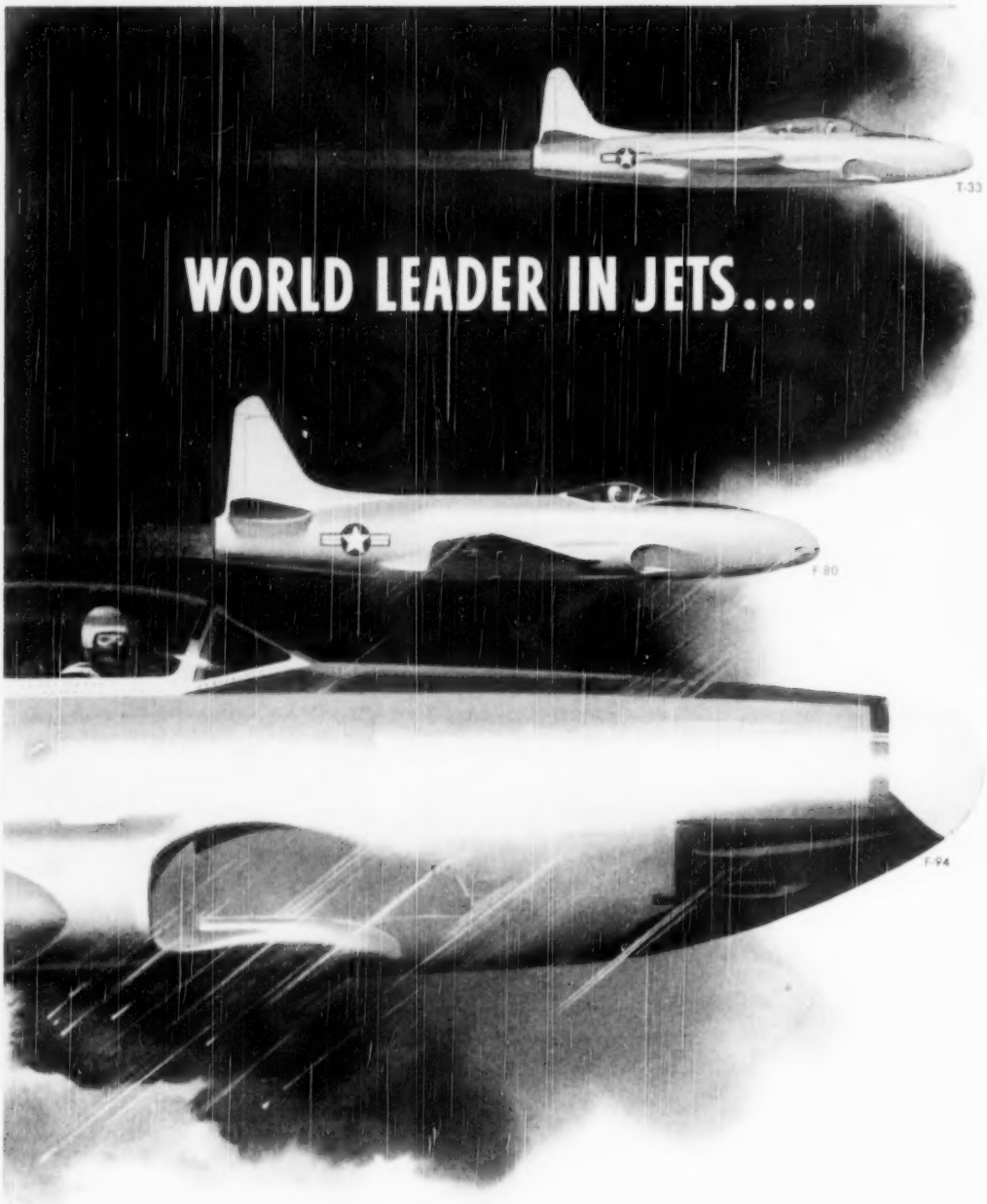
Besides the Piper Clipper installation, the Geisse gear has been flight and taxi tested on a Bellanca Cruisair, and on a Twin Beech executive transport. He modifying existing swiveling gears on these planes to incorporate the new Geisse principle.

The former CAA consultant has stated that owners of existing aircraft now in the market for crosswind gears would be "unwise" to wait for his gear development to become commercially available, thus foregoing the advantages of crosswind gears until his device would be ready for sale.

Zero Reader Orders

Production orders for an undisclosed number of Zero Reader flight instruments to equip USAF Northrop F-89 jet all-weather interceptors have been announced by Sperry Gyroscope Co., Great Neck, N. Y.

The Zero Reader has already been designated for installation in the North American F-86D all-weather version of the Sabre, according to Sperry.



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Now, another "first" is being pushed in quantity at the Lockheed jet plant. The F-94 All-Weather Interceptor Fighter is the first production all-weather jet to go into service for the U.S. Air Force.

The F-94 provides America with around-the-clock, around-the-calendar defense. Advanced radar equipment permits this speedy jet to intercept and engage aircraft in total darkness and in adverse weather which would ground today's standard fighters.

Afterburners provide F-94's with spectacular speed and stand-overability. And smooth, steady flight—characteristic of all Lockheed jets—makes the F-94 a perfect gun mount for its powerful armament.

The experience obtained in the design, development and manufacture of these practical jet airplanes is invaluable in the Lockheed laboratories where the planes of the future are taking shape today.

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Look to Lockheed for Leadership

Avro's Orenda Gets Flight Check

Flight testing of the Orenda, powerful turbojet engine being built by Avro Canada, has begun at Malton Airport near Toronto.

Two of the engines have been installed in the outboard nacelles of a converted Lancaster bomber originally made by Victory Aircraft, Avro Canada's forerunner. The engines will thus be tested over a wide range of flight conditions to supplement the hundreds of ground run hours already accumulated on the Orenda.

Purpose of the flight tests is to confirm the performance of the engines before installing them in the CF-100, Avro Canada's all-weather fighter. (Rolls Royce Avons are presently fitted in the CF-100.)

Much emphasis will be placed on evaluation of fuel system and controls. Flight maneuvers will subject the engine to loads and accelerations not possible to simulate in ground tests.

▶ **Bomber Conversion**—The converted Lancaster is powered by two Rolls-Royce Merlin piston engines in the inboard nacelles, in addition to the two Orendas. Flight can be sustained by these piston engines alone.

Simple fairings were substituted for the front and rear gun turrets on the Lancaster. Complete winterization of the aircraft has been done, for possible extension of the flight testing into cold conditions.

A test observer's instrument panel has been installed at the navigator's position, and photopanels are located in the rear of the fuselage.

Performance data on the Orenda are secret. So are all the data on the Lancaster, as far as endurance, range and performance go.

DH Comet Features Submerged Antennas

The sleek look of de Havilland's jet-powered transport, the Comet, is due in part to a completely submerged antenna system developed by Marconi's Wireless Telegraph Co., Ltd., England. The Comet is the first British civil aircraft to be so fitted, although the Aeropical Andravida is slated to have such a system.

Fin of the Comet is electrically insulated from the fuselage attachments and serves as a high frequency antenna. Dielectric tips of fin and stabilizer house the VHF and ILS aerials. A medium frequency grid antenna is submerged in a dielectric panel in the nosewheel doors, and the ADF loop is installed in the fuselage tip under thick dielectric windows.

The ILS glide path indicator antenna is placed behind the windshield and the ILS marker, DME and radio altimeter antennas are all housed in underside fillets.

In addition to the submerged antenna system, the remainder of the Comet's radio communication and navigational equipment has been engineered and constructed by the Marconi company.

Test Fire-Resistant Hydraulic Fluid

A Civil Aeronautics Administration DC-4 has passed 250 hours of flying time with Hollingshead H-2 flame resistant fluid in its hydraulic system at the Standardization Center in Oklahoma City. Only minor problems, such as seal swelling and filter clogging, have developed.

A CAA DC-3, operating from the same base, has accumulated several hundred hours using Hollingshead H-4 fluid.

Corrosion of magnesium brake components has been the only trouble encountered so far with this low-pressure system.

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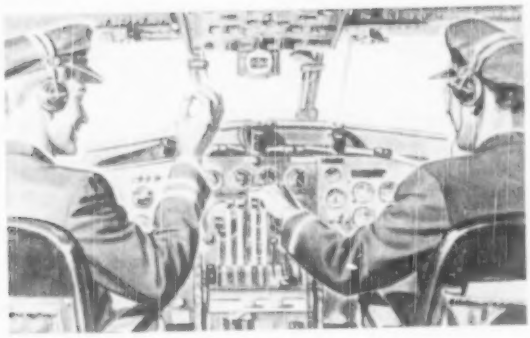

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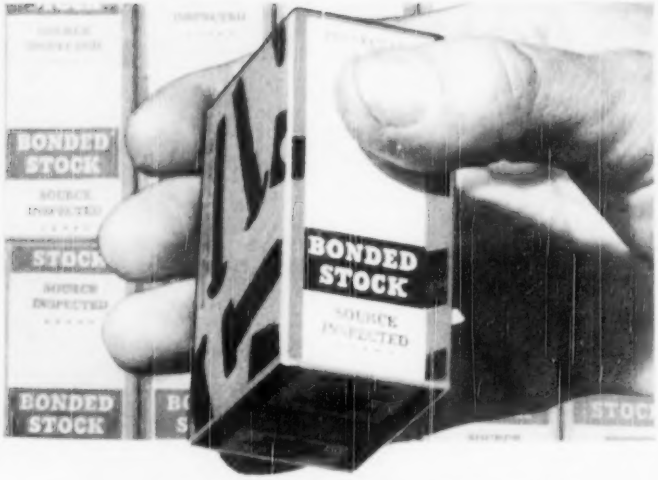

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Copter Analysis

Piasecki reviews ten failings of present-day rotary wing craft.

By David A. Anderton

What's wrong with today's helicopters?

Ten things, said Frank N. Piasecki, chairman of the board of Piasecki Helicopter Corp. and designer of famous helicopters. And then he proceeded to enumerate and discuss the major sight-sores against rotary wing craft.

When he finished, the audience at a joint meeting of the American Society of Mechanical Engineers, the Institute of Aeronautical Sciences and the American Helicopter Society had heard the ten faults laid squarely at the feet of designers. They had also heard some suggestions for tomorrow's copters.

▶ **Blame Divided**—The ten trouble spots fell up in a six and four basis, with the larger number placed at the door by the

structures team. Aerodynamicists drew the other four squawks. And the complete list reads like this:

▶ **Structural Responsibility**:

Dependability: freedom from minor annoyances which can ground; **maintenance** (where it is a function of engineering restrictions on the operating life of rotating parts); **all-weather operations** (but only where high strength or resistance to corrosion or arctic conditions are factors); **vibration**; **complexity**; **cost**.

▶ **Aerodynamic Responsibility**:

Flying qualities; **payload** (but where increases come from better lifting efficiencies); **range** (not by adding fuel, but by subtracting drag); **speed**.

▶ **Dependability**—Helicopter operations have been hampered by a number of annoyances such as oil pump property loss, lubrication system blocks, bearing handling, clutch wear and the like.

The solution, said Piasecki, will

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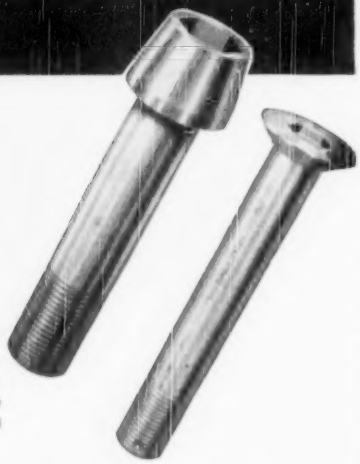

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large-scale production orders, so that tooling costs could be amortized over many aircraft.

The implications here are fairly obvious, too. Designing for the application of existing machine tools, standardization of materials and processes, and volume production are the answers. And the first two can be supplied by careful design.

► **Flying Qualities**—The primary criticism here was insufficient stability, resulting in "excessive pilot effort to maintain continuous blind flight."

Loads can actually be reduced by the use of bungee or servo systems, thereby relieving some of the strain on the pilot.

While the problem of blind flight in the hovering regime is one that has not been completely licked, methods to achieve this have been conceived. Although Piasecki did not specifically mention it, the rotor attitude sensor developed by Bell Aircraft Co. (AVIATION WEEK June 26, 1950) would appear to be one of the applicable methods.

► **Payload**—Piasecki stated that the useful load of the largest helicopter is less than one-tenth that of the largest airplane.

This disparity can be cured both by increases in aircraft size, and improvements in the lifting efficiency; both of these cures are design.

There seems to be, for example, no obvious limit to the practical size of the helicopter rotor. One project, said Piasecki, plans a diameter sufficient to lift a light tank.

Rotor disk loadings (analogous, but not comparable to airplane wing loadings) can be increased to boost the lifting capacity of present-day ships. Generally, this means higher sinking speeds in autorotation, but research programs will provide information for the designer.

Structural and aerodynamic efficiency increases also will improve the weight-carrying characteristics of copters, whose current useful load capabilities represent about one-third of the gross weight. For driving the rotors, a gas turbine, instead of the present piston engine, can increase the useful load by 35 percent. Payload, contracted with useful load, depends on range, but even at 200 miles, the improvement due to the turbine is almost 20 percent.

► **Range**—Since most helicopter missions are short-range, this particular problem does not appear too bad. It can be licked by design, and it is desirable to do so.

Any drag reduction, for example, benefits the range and drag reduction is one of the chief functions of aerodynamics.

Piasecki also said that the range could be extended by flight refueling.

1929

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It was no place for men or machines. They called it Little America, a frozen outpost on the edge of the Antarctic. From this dreary base, Admiral Byrd and his crew headed their Ford Tri-motor monoplane due south into the unknown—and flew back a few anxious hours later marked for fame as the first aerial explorers of the South Pole. It was a milestone in flight-metal history, too. Byrd's plane was all-metal—with spars, bulkheads and skin of Alcoa Aluminum!

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depending on the helicopter's unique ability to hover above the tanker, whether afloat or land-based.

This is a lot like solving the problem by avoiding it, because any aircraft range can be increased through the addition of fuel. What is important is that the range parameter of miles per gallon, or gallons per hour, be optimized through design—aerodynamic cleanliness, increased load-carrying ability, engine improvements.

▶ **Speed**—Hand in hand with the problem of range is that of speed. Piasecki stated that "... we have made excuses to ourselves in the past by pointing out that the function of our aircraft is not to travel great distances and therefore high speeds were not a necessary part of our performance requirements."

Technically, the thing that keeps helicopter speeds pegged to a low level is stalling of the retreating blade. And, as is well known, stalling can be overcome by either increased speed or reduced angle of attack.

Those two features, said Piasecki, can be done. And he again hammered at the point of drag reduction, stating that the external cleanliness of the helicopter still does not equal that of the 1955 airplane.

To go faster, one needs more power, even with clean aircraft. A little prognostication by the speaker, who verbally added a propeller or jet thrust to the helicopter designs, led to a guesstimated speed in excess of 250 mph., nearly doubling today's operating velocities.

▶ **Composite Design**—There are all the improved components and pieces for tomorrow's rotary-winged craft. Piasecki did not pick them up and put them together, probably preferring to do that later in a military competition. But taken as a whole, the helicopter could be:

- **Larger**, because of increased structural efficiency.
- **Faster**, due to higher rotational tip speeds and aerodynamic cleanliness.
- **Stronger**, because of increased disk loading and the substitution of the superior power-weight ratio of the gas turbine.
- **Safer**, with special technique for blind flight, with vibrationless airframes and extended service life.
- **Simpler** helicopters, with metal blades, easy maintenance and accessibility, and simplification in the detail design.

▶ **On the Way**—So, bigger and better rotary winged craft are in the offing. Their proximity depends on the designers, on research programs, on customer needs—and of course, on some fair-sized government orders.

And if the manufacturers take Piasecki's advice, the only thing tomorrow's helicopters will have in common with today's will be rotating wings.

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PT	A4	—2	1/16	1/4	1.98	1.47	17.89	16.75	9.90	8.92	7.90	7.30
PT	A4	—3	1/16	3/8	1.99	1.49	18.12	16.44	9.94	8.94	7.98	7.41
PT	A5	—1	1/16	1/8	2.00	1.53	19.15	15.93	9.8	8.76	7.9	7.19
PT	A5	—2	1/16	1/4	2.03	1.62	19.60	17.12	10.40	9.26	8.3	7.62
PT	A5	—3	1/16	3/8	2.06	1.64	19.93	16.88	10.40	9.26	8.34	7.62
PT	A5	—4	1/16	5/16	2.18	1.86	19.77	17.41	10.60	9.60	8.65	8.06
PT	A6	—1	1/16	1/8	2.16	1.88	19.17	16.84	10.20	9.10	8.20	7.50
PT	A6	—2	1/16	1/4	2.18	1.90	19.60	17.12	10.60	9.60	8.65	8.06
PT	A6	—3	1/16	3/8	2.19	1.96	19.61	17.12	10.60	9.60	8.65	8.06
PT	A6	—4	1/16	5/16	2.26	2.03	20.70	18.00	10.90	9.91	8.91	8.32
PT	A6	—5	1/16	5/8	2.40	2.24	22.36	19.03	11.59	10.06	9.06	8.38
PT	A8	—2	1/16	1/4	2.39	2.19	21.17	18.38	11.10	10.00	9.01	8.41
PT	A8	—3	1/16	3/8	2.54	2.33	22.18	19.28	11.68	10.68	9.68	9.09
PT	A8	—4	1/16	5/16	2.64	2.43	22.64	19.68	11.88	10.88	9.88	9.29
PT	A8	—5	1/16	5/8	2.79	2.63	23.25	20.21	12.48	11.48	10.48	9.79

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PT	A4	—1	1/16	1/8	1.61	1.11	12.85	10.41	10.04	10.04	9.14	8.79
PT	A4	—2	1/16	1/4	1.69	1.24	13.89	10.93	10.93	10.93	9.93	9.57
PT	A4	—3	1/16	3/8	1.78	1.31	14.78	11.54	11.54	11.54	10.54	10.41
PT	A5	—1	1/16	1/8	1.72	1.3	13.85	10.85	10.85	10.85	10.85	10.85
PT	A5	—2	1/16	1/4	1.79	1.35	14.70	11.46	11.46	11.46	10.46	10.46
PT	A5	—3	1/16	3/8	1.84	1.39	15.39	12.13	12.09	12.09	11.09	11.09
PT	A5	—4	1/16	5/16	2.15	1.54	16.94	13.40	12.50	12.50	11.50	11.50
PT	A6	—1	1/16	1/8	1.94	1.46	15.75	12.75	12.75	12.75	11.75	11.75
PT	A6	—2	1/16	1/4	2.00	1.52	16.40	13.40	13.40	13.40	12.40	12.40
PT	A6	—3	1/16	3/8	2.06	1.58	17.06	13.98	13.98	13.98	12.98	12.98
PT	A6	—4	1/16	5/16	2.14	1.64	17.74	14.48	14.48	14.48	13.48	13.48
PT	A6	—5	1/16	5/8	2.41	1.81	19.94	16.34	15.34	15.34	14.34	14.34
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PT	A8	—3	1/16	3/8	2.42	1.82	20.22	16.62	15.62	15.62	14.62	14.62
PT	A8	—4	1/16	5/16	2.49	1.89	20.89	17.29	16.29	16.29	15.29	15.29
PT	A8	—5	1/16	5/8	2.66	2.06	22.66	18.66	17.66	17.66	16.66	16.66

SELF-PLUGGING A175-T ALUMINUM BRAZIER OR 100° C'SUNK HEAD

Part No. Type	Dia. In 16ths	Grip In 16ths	Material Thickness (Inches) From	To	Price Per 100 100 to 499	500 to 999	Price Per 1000 1,000 to 4,999	5,000 to 9,999	10,000 to 19,999	20,000 to 49,999	50,000 to 99,999	100,000 to 199,999
SSP	A4	—1	1/16	1/8	2.07	1.60	19.80	18.08	10.61	9.61	8.70	8.10
SSP	A4	—2	1/16	1/4	2.12	1.65	19.93	18.00	10.65	9.65	8.75	8.15
SSP	A4	—3	1/16	3/8	2.14	1.69	19.9	17.46	10.69	9.69	8.79	8.18
SSP	A5	—1	1/16	1/8	2.13	1.66	19.85	16.85	10.85	9.85	8.85	8.85
SSP	A5	—2	1/16	1/4	2.17	1.70	20.30	17.30	10.89	9.89	8.89	8.89
SSP	A5	—3	1/16	3/8	2.20	1.73	20.58	17.43	10.89	9.89	8.89	8.89
SSP	A5	—4	1/16	5/16	2.32	1.87	21.26	18.18	11.18	10.18	9.18	9.18
SSP	A6	—1	1/16	1/8	2.28	2.12	20.68	19.21	11.79	9.99	9.29	8.54
SSP	A6	—2	1/16	1/4	2.44	2.32	20.85	19.41	11.79	10.79	9.47	8.66
SSP	A6	—3	1/16	3/8	2.53	2.41	21.29	19.85	12.25	11.4	10.39	9.66
SSP	A6	—4	1/16	5/16	2.63	2.51	21.80	20.31	12.75	11.91	10.91	10.19
SSP	A6	—5	1/16	5/8	2.97	2.81	23.28	21.68	13.75	12.91	11.91	10.17
SSP	A8	—2	1/16	1/4	2.98	2.75	21.84	20.13	16.34	14.4	13.44	12.95
SSP	A8	—3	1/16	3/8	3.17	2.94	22.17	20.43	16.64	14.64	13.64	13.15
SSP	A8	—4	1/16	5/16	3.43	3.19	22.43	20.69	16.89	14.89	13.89	13.40
SSP	A8	—5	1/16	5/8	3.74	3.50	24.07	21.97	17.97	15.97	14.97	14.48

SELF-PLUGGING MILD STEEL BRAZIER OR 100° C'SUNK HEAD

Part No. Type	Dia. In 16ths	Grip In 16ths	Material Thickness (Inches) From	To	Price Per 100 100 to 499	500 to 999	Price Per 1000 1,000 to 4,999	5,000 to 9,999	10,000 to 19,999	20,000 to 49,999	50,000 to 99,999	100,000 to 199,999
SSP	A4	—1	1/16	1/8	1.61	1.11	12.85	10.41	10.04	10.04	9.14	8.79
SSP	A4	—2	1/16	1/4	1.69	1.24	13.89	10.93	10.93	10.93	9.93	9.57
SSP	A4	—3	1/16	3/8	1.78	1.31	14.78	11.54	11.54	11.54	10.54	10.41
SSP	A5	—1	1/16	1/8	1.72	1.3	13.85	10.85	10.85	10.85	10.85	10.85
SSP	A5	—2	1/16	1/4	1.79	1.35	14.70	11.46	11.46	11.46	10.46	10.46
SSP	A5	—3	1/16	3/8	1.84	1.39	15.39	12.13	12.09	12.09	11.09	11.09
SSP	A5	—4	1/16	5/16	2.15	1.54	16.94	13.40	12.50	12.50	11.50	11.50
SSP	A6	—1	1/16	1/8	1.94	1.46	15.75	12.75	12.75	12.75	11.75	11.75
SSP	A6	—2	1/16	1/4	2.00	1.52	16.40	13.40	13.40	13.40	12.40	12.40
SSP	A6	—3	1/16	3/8	2.06	1.58	17.06	13.98	13.98	13.98	12.98	12.98
SSP	A6	—4	1/16	5/16	2.14	1.64	17.74	14.48	14.48	14.48	13.48	13.48
SSP	A6	—5	1/16	5/8	2.41	1.81	19.94	16.34	15.34	15.34	14.34	14.34
SSP	A8	—2	1/16	1/4	2.36	1.76	19.61	16.01	15.01	15.01	14.01	14.01
SSP	A8	—3	1/16	3/8	2.42	1.82	20.22	16.62	15.62	15.62	14.62	14.62
SSP	A8	—4	1/16	5/16	2.49	1.89	20.89	17.29	16.29	16.29	15.29	15.29
SSP	A8	—5	1/16	5/8	2.66	2.06	22.66	18.66	17.66	17.66	16.66	16.66

Group Pricing: Prices are based on the total quantity ordered at one time regardless of the type, head, grip length or material. When different items are to grouped, a small charge is made to cover the additional handling required.

Split Shipments: Orders exceeding 25,000 pieces of any one item may be scheduled over a period of time ranging from 3 to 12 months depending upon the quantity. For such split shipments, a small charge is made to cover the additional handling required.

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Plus nose assembly $13.85

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Indicator Monitors Power Supply

Bendix development warns of a.c. supply failure, low voltage; features small size, lightweight indicator.

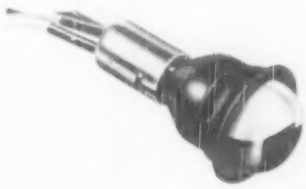
Failure of power supply for gyroscopic flight instruments can now be detected quickly by means of a new warning device.

Now in production at the Eclipse-Pioneer division of Bendix Aviation Corp., the indicator will give warning of either low system voltage or failure in one or more phases of the ac power supply.

And this warning will occur several minutes before gyros begin precession, which gives the pilot ample time to switch to a standby power supply.

▶ **Small Size**—Physically, the power failure indicator is about the size of a standard vacuum tube. It is normally mounted near the electric gyro flight instruments.

Principle of the indicator depends upon the stall torque characteristics of a tiny induction motor mounted inside.



A cup-shaped indicator cap, half painted black and half luminescent, is mounted on the front end of the rotor shaft.

A glass cover, half painted black and half transparent, encloses the moving cap.

Normally, the induction motor is energized by the ac power supply. The rotor works against a hair spring which permits rotation until the hair spring torque equals the motor torque.

▶ **Display Method**—Under these conditions, the instrument face is completely black.

Should the system voltage drop to 22 volts from its normal value of 26 volts, the hair spring begins to overcome the motor torque and the luminescent half of the moving cap begins to show.

The degree to which the cap becomes visible depends on the amount of voltage drop.

Should the system voltage drop below 18 volts, or should power failure occur in any phase, the luminescent half of the moving cap becomes completely visible.

▶ **Specifications**—Eclipse-Pioneer Division designates the power failure indicator as Type 36200, with two subtypes whose difference lies in the color of luminescent paint available—yellow or orange.

Weight of the indicator is about 6 oz., including plug and leads. It has a polarized, bayonet-base socket, with three 36-in. leads.

Power required is 26v., 400-cycle, 3-phase alternating current, with a phase rotation of A-C-B.

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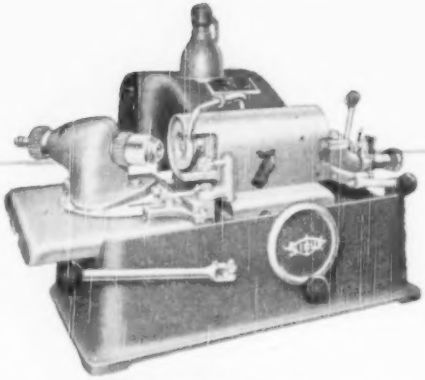

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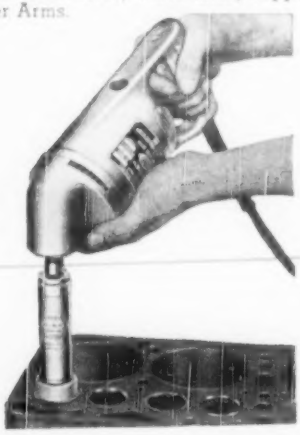
More Dollar Value than ever before

Wet Grinding eliminates heat and distortion, producing finest finish and factory precision. Wet Grinds Valves, Valve Ends, Tappets and Rocker Arms.



SIOUX PERFECTED DUAL ACTION VALVE SEAT GRINDER with Ball Bearing Holder

Precision work in fast time by the almost unbelievable speed of this valve seat grinder. Perfected dual action provides controlled fine vibration for grinding accuracy and dispersion of cuttings. Uniform finish is assured.

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SALES & SERVICE

Public Forum

Free monthly aviation meetings begun as sales aid by Teterboro school.

Teterboro School of Aeronautics is going after prospective students with a new sales approach—monthly aviation forums open to the public.

The first session, staged without the elaborate publicity planned for later meetings, garnered two students. In addition, the school's head, Charles Willis, former president of Willis Air Service, believes the talks will serve two other purposes: Boost morale of the present student body and build company prestige.

Willis also believes the new idea will cut a considerably the cost to the school of $20 for each new student lead.

▶ **Candid Speaking**—Willis is planning to get speakers for these forums who can candidly discuss current aviation operations and problems without being tied down in their remarks by official comments.

Each forum will present three speakers. Willis now is negotiating for local radio station cooperation and may have the discussions recorded for broadcasting.

As part of the forum also the audience will be taken on a tour of the schooling facilities to stir interest in signing up. The school's records show that most of those taken on such a tour have signed up for courses.

Willis considers the forums a good focus for continuing interest in the courses. He estimates that about 25 percent of his students drop out before completion, and feels that by offering them lively discussions by men active in different phases of the industry, the original enthusiasm of the students can be maintained.

Civilian Schools To Train AF Mechs

The Spartan School of Aeronautics at Tulsa, Okla., and Cal-Aero Technical Institute, Glendale, Calif., have been awarded contracts totaling $592,000 for training 550 USAF airplane and engine mechanics.

The two schools, sharing equally in the contracts, will train 275 enlisted personnel each. Training periods will last 36 weeks, which is the same length of time utilized by current military technical schools giving the identical instruction.

The program is being tried by USAF to test the practicability of technical training by civilian contracts. It follows completion of a study which was conducted last year by Stanford Research Institute.

Report of the Institute pointed out that substantial budgetary savings could be effected through elimination of administrative overhead inherent in military organization. Accountants, military administrative facilities and personnel needed for manning a mobile training base (technical or non-technical) are other advantages in addition to a high quantity of trained personnel for graduated continuously, it was said.

The last school may phase from among 47 civilian agencies competing prospects to 6% Air Force for its best training prospect.

Training by the two schools are scheduled to begin last week and will be completed by June 30, 1951.

Air Fair Aid

Detailed suggestions for planning a sale and show as fun can be found in a new Civil Aeronautics Administration booklet. Airport operators interested in staging such an event can find many handy pointers.

Included are suggestions on sponsors, financing, committees, programs, exhibits and follow-up. An appendix describes an actual "well run, well planned and effective" air fair. Pointed up is how such a display can be handled so as to educational medium and still provide entertainment, rather than have it degenerate into a "third rate carnival" affair, it states.

The booklet is available for 20 cents from the Supt. of Documents, Government Printing Office, Washington 25, D. C.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶ **Plane Ownership**—More than one-fourth of U. S. private planes are located in California, with Los Angeles county registration [illegible] accounting for [illegible] Dade County, the counties of any other U. S. county. Upper Middle West and East hold the lead in total number of planes: California has 10,[illegible] and planes registered, Texas 9,[illegible] and Illinois has 8,[illegible].

▶ **Helley Time Payments**—A "[illegible]" plan to make helicopter purchase easier on the pocketbooks of personal private and operation economy has been worked out by Helley Helicopters. The Palo Alto, Calif., firm has established a "helicopter acceptance account" using a capital reserve built up from dealer accounting sales to finance purchases.

STEVE WITTMAN'S BUTTERCUP

This neat little high-wing monoplane, built by racing pilot Steve Wittman back in 1938 to flight test his flexible steel single strut landing gear, is still used by him to test new design ideas and to provide transportation to air meets. The Buttercup seats two side by side. It is powered by an 85-hp. Continental fitted with a swept-blade racing prop. Top speed is said to be 150 mph., cruising speed 130 mph., and landing speed 30 mph. A tapered tubular-type flexing landing gear is now undergoing testing on the plane. Wittman has also built a four-place personal plane, now being tested.

AIR FORCE CONTRACTS

May Awards Total $189 Million

Contracts for $189 million are included in the list of May awards released by the Air Force (AVIATION WEEK July 31, p. 52). In this total are 53 cost-plus-fixed-fee contracts worth $78 million. The awards do not yet reflect increased contract activity resulting from the Korean war nor procurement of confidential items.

Alphabetical listing of contracts begins here, with completion of publication scheduled next week.

AC Spark Plug div., General Motors Corp., Flint, Mich., types AC-181 and P-87 spark plugs, Sept., 1950, $62,954; .412 each plug assemblies, July, 1950, $7629.

Acme Construction Co., Darien, dynamometer testing field, Sept., 1950, $19,474.

Acme Visible Records, Inc., Cincinnati, files, July, 1950, $14,227.

Adel Precision Products Corp., Hudlington, W. Va., electrically heated cushion clips, Sept., 1950, $24,491.

Aerocrafts, Austin, safety belts, July, 1950, $56,928.

Aero Supplies, Los Angeles, nuts, Sept., 1950, $6581.

Aerroll Products Co., S. Hackensack, N. J., spray cleaner and handbook data and engineering data, Nov., 1950, $19,094.

Aerojet Engineering Corp., Azusa, Calif., study of rocket fire protection, Oct., 1951, $120,000.

Aeronautics Bureau of, Washington, components of radar set, July, 1950, $76,500; to transfer funds for performance of administrative services, Mar., 1951, $10,000.

Aeroquip Corp., Jackson, Mich., half couplings, Sept., 1950, $5130; hose fittings, Aug., 1950, $33,806.

Air Speed Tool Co., Los Angeles, portable pneumatic drill, Sept., 1950, $25,784.

Aircooled Motors, Inc., Syracuse, N. Y., conversion of 10 model 0-235-3 engines to model 0-470-3 engines for H-13 helicopter, Aug., 1950, $24,878; ten 0-335-2 aircraft engines used in H-13 helicopter, Nov., 1950, $31,187.

Airesearch Mfg. Co. div., Detroit Corp., Los Angeles, heat exchanger, Sept., 1950, $14,512.

Airquipment Co., Burbank, Calif., 112 each trailer with storage rack, Oct., 1950, $18,612.

Akeley Camera, Inc., New York, overhaul, repair and modification of Akeley photo-theodolite units, June, 1951, $44,875.

Aluminum Company of Amer., Washington, aluminum alloy sheet, Oct., 1950, $5[illegible].

American Bosch Corp., Springfield, Mass., magneto assemblies and spare parts, Dec., 1950, $84,003; gaskets for maintenance of ignition harnesses, Oct., 1950, $5931.

American Finishing Co., Memphis, waterproof fabric, Aug., 1950, $41,300.

American Gas Accumulator Co., Elizabeth, N. J., asymmetrical blue plastic, June, July, 1950, $5670; cable adapter assembly plug assembly and receptacle assembly, Aug., 1950, $100,000; white nylon lens assembly, type M-1 elevated canvas marker, Oct., 1950, $14,500; elbow cone and return assembly, Aug., 1950, $41,850; lamp assembly, Aug., 1950, $2620.

American Graded Sand Co., Chicago, cleaning compound, Sept., 1950, $15,288.

American Hair and Felt Co., Chicago, felt, July, 1950, $23,710.

American Pad and Textile Co., Greenfield, Ohio, 1-2 flying jackets, Dec., 1950, $259,606.

American Phenolic Corp., Chicago, transmission fittes and connectors, Apr., 1951, $183,576.

American Society of Mechanical Engineers, New York, publications of the Applied Mechanics Reviews, Apr., 1950, $10,000.

American Steel Co., Pittsburgh, coffee pots, Sept., 1950, $28,837.

American Steel and Wire Co., Cleveland, steel wire, July, 1950, $7873.

American Time Products, Inc., New York, rate recorder watch, June, 1950, $7707; timing forks, etc., June, 1951, $1500.

Ampro Corp., Chicago, miscellaneous photographic spare parts, Dec., 1950, $13,971.

Ansco div., General Aniline Film Corp., Binghamton, N. Y., thermometer, Aug., 1950, $17,950.

Apex Tire Rubber Co., Pawtucket, R. I., plugs, Sept., 1950, $8684.

Apple, W. A., Textile Mfg. Co., Dayton, flight engineer case, Oct., 1950, $5942; parachute harness assembly, Sept., 1951, $907,[illegible]-240.

Armour Research Fdtn., Chicago, special function generator for electronic analog simulation, Feb., 1951, $36,949.

Armstrong-Blum Mfg. Co., Chicago, power hacksaw, Nov., 1950, $44,284.

Armstrong Cork Co., Lancaster, Pa., rubber tape work, July, 1950, $7984.

Auto-Valve, Inc., Trenton, drain valves, Oct., 1950, $5750.

Automatic Electric Sales Corp., Chicago, installation of automatic central office telephone equipment work to be performed at certain AF bases, Apr., 1951, $67,619.

Aviation Engineering Corp., Ozone Park, N. Y., external thermometers, Feb., 1951, $21,250.

Aviators Clothing Co., Inc., Beacon, winter-type flying helmets, Nov., 1950, $32,832.

B. G. Corp., New York, spark plugs, July, 1950, $26,790.

Baird Associates, Inc., Cambridge, Mass., infra-red viewer, May, 1951, $35,300.

Ballantine Laboratories, Inc., Boonton, N. J., portable voltmeters, Sept., 1950, $15,860.

Barber-Colman Co., Rockford, Ill., thermostat element actuator assembly, box assembly, Aug., 1950, $20,638.

Barden Corp., Danbury, Conn., ball bearings, Sept., 1950, two contracts, $32,290, $14,521.

Battelle Memorial Institute, Columbus, O., research on the problem of heat transfer from a supersonic stream at high temperatures and heat fluxes, June, 1951, $25,000; research and development to determine causes of cracking in high-strength weld metals, Oct., 1951, $20,411; research on molybdenum-base alloys prepared by powder metallurgy techniques, Aug., 1951, $97,100.

Bausch and Lomb Optical Co., Rochester, N. Y., footprint-metal camera, auto collimator, Oct., 1950, $7658.

Beech Aircraft Corp., Wichita, aircraft spares, June, 1950, $68,215; metal short range boat, Nov., 1950, $46,750.

Bell-Howell Co., Chicago, A-4A cameras, June, 1950, $7181.

Bendix Aviation Corp. Pacific div., No. Hollywood, actuator assembly, Dec., 1950, $12,485; hydraulic accumulators, Nov., 1950, $9472.

Bendix Products div., Bendix Aviation Corp., South Bend, Ind., spare parts for T-6, AT-16, C-47 and H-21 aircraft, June, 1950, $151,214; industrial planning survey on structures, Mar., 1951, $140,000; spare parts for wheels and brakes, June, 1951, two contracts, $76,952, $22,096; carburetors, spare parts and fuel system spare parts, Apr., 1951, $757,692; carburetor spare parts, Apr., 1951, $494,447.

Bendix Radio div., Bendix Aviation Corp., Baltimore, components for radar compass, Feb., 1951, $105,547; spare parts for radar set, Apr., 1951, $274,000.

Bertram, Harvey P., Co., Cincinnati, electric fan, Sept., 1950, $9482.

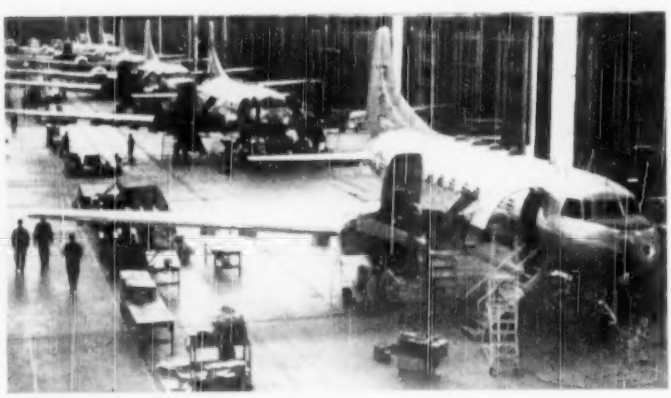
Bird Electronic Corp., Cleveland, antenna, Mar., 1951, $74,000.

Biles Electric Co., Erie, Pa., crystal holders for marine radio crystal units, Feb., 1951, $71,000.

Blue Anchor Overall Co., Philadelphia, large 12-2 air crew caps, Nov., 1950, $12,000.

Bode Film Co., Darien, spares for M-1 Dutch Tractor, Sept., 1950, $9659.

Boeing Airplane Co., Seattle, spare parts for B-50 aircraft, July, 1950, three contracts, $15,[illegible], $179,774, $96,968; spare parts for B-50 airplanes to be positioned under Class 6, Aug., 1951, $187,222; production study for B-47 airplane, July, 1951, $161,244; design, metals to a B-50 aircraft conditioned recordings flush antenna, Feb., 1951, $[illegible], additional modification and instrumentation of government-owned gunfire airplane, June, 1950, $12,074; kits for A-C power airplanes and miscellaneous engineering changes, Dec., 1950, $[illegible]; kits for Sample of spares change No. 226 on B-50 and B-50 airplanes, Mar., 1951,



FLYING SCHOOLHOUSE LINE

Convair T-29 navigation trainers move down the company's production line at San Diego. Air Force orders for the military adaptation of the Convair liner are scheduled to keep the line rolling well into 1951. The company has already turned out more than 200 civilian counterparts, including 178 with pressure cabins.

$12,168; miscellaneous kits for retrofit of master change Nos. 241, 310 and PRR 1475, Apr., 1951, $35,891; kits and parts for retrofitting of B-50 change No. 333, Aug., 1950, $22,915; master list of MCR PRR and PCR changes which have been accomplished on all B-50 airplanes, July, 1950, $10,588; additional special tools and ground handling equipment transportation dolly assemblies, Nov., 1950, $160,000; additional turbosupercharger flight test program on government-owned B-50, June, 1950, $24,420.

Boeing Airplane Co., Wichita, spare parts for B-29 and B-50 airplanes, Aug., 1951, $16,081.

Bohn Aluminum-Brass Corp., Detroit, spare parts C-2 and F-1 truck tractors, Jan., 1951, $5598.

Bolsey Corp. of America, New York, 35mm. still cameras, Sept., 1950, $14,762.

Bone Engineering Corp., Glendale, Calif., design and finish propeller test rig pedestal assembly, July, 1950, $8458.

Breeze Corp., Newark, N. J., ignition harness assemblies, July, 1950, $9930.

Bristol Mfg. Corp., Bristol, R. I., type N-1 flying shoes, Oct., 1950, $100,428.

Brown, Gordon D., Associates, Beverly Hills, Calif., tie down devices, July, 1950, $95,320.

Browne, Stewart R., Mfg. Co., New York, electric lamp assembly worklight extension, July, 1950, $54,790.

Brubaker-Ugrin Engrs., Beverly Hills, Calif., hand operated iron and commercial data, Sept., 1950, $21,072.

Buchsbaum, S., and Co., Chicago, container assembly, Oct., 1950, $17,160.

Burlington Mills, Burlington, Wis., hair felt, June, 1950, $5563.

Canadian Commercial Corp., Montreal, Canada, spare parts for maintenance of C-47, Dec., 1950, $25,000; spare parts for maintenance of C-47 and C-54 aircraft, Dec., 1950, $500,000.

Capewell Manufacturing Co., Hartford, Conn., parachute harness adapter, Dec., 1950, $5400.

Cappel, MacDonald Co., Dayton, emergency sustenance kit, Oct., 1950, $151,172.

Cardel Manufacturers, Dayton, stand assembly, Feb., 1951, $76,725.

Carlisle Tire, Rubber div., Carlisle, Pa., tubes, May, 1951, $18,149.

Chase Aircraft Co., Inc., W. Trenton, N. J., repair of XC-123 airplane which incurred damage during taxi accident, June, 1950, $125,000.

Cherry Rivet Co., Los Angeles, blind rivets, Sept., 1950, $7532.

Chicago Aerial Survey Co., Chicago, photographic printers, Nov., 1950, $10,088.

Chicago Pneumatic Tool Co., Detroit, driver, pneumatic portable, Aug., 1950, $31,800; drill, pneumatic portable, Sept., 1950, $10,526.

Cincinnati Engine Parts Co., Cincinnati, spare parts for C-12, C-12A, A-APU powerplants, Nov., 1950, $16,894.

Circo Products Co., Cleveland, metal partcleaner, Aug., 1950, $7472.

Clark, David, Co., Inc., Worcester, Mass., regulating valves, Jan., 1951, $22,548.

Clark Metal Products Inc., Fairfield, Conn., lubricator pumps, Feb., 1951, $9430.

Cleveland Automatic Machine, Cincinnati, screw machine, Oct., 1950, $18,628.

Cleveland Pneumatic Tool, Cleveland, industrial planning survey of strut assemblies, Feb., 1951, $68,344.

Collins Radio Co., Cedar Rapids, Iowa, radio receivers spare parts instruction books, Aug., 1950, $18,771.

Color Service Co., New York, training reproductions, Dec., 1950, $18,000.

Commonwealth Engineering Co., Dayton, furnish and install radiological test equipment, July, 1950, $3347.

Consolidated Photo-Engravers Equipment, Chicago, furnish and install automatic mount for large vertical-type camera, July, 1950, $11,000; installation of large vertical-type camera, Dec., 1950, $4460.

Consolidated Radio Products Co., Chicago, [illegible], Dec., 1950, $23,000.

Consolidated Vultee Aircraft div., Consolidated Vultee Aviation Corp., Ft. Worth, Tex., [illegible] airplanes, Nov., 1950, [illegible]; [illegible] airplanes, Dec., 1950, $47,286; additional tools required for [illegible], Nov., 1950, $1,528,413; additional other kits, Nov., 1950, $41,447.

Continental Aviation and Engineering Corp., Detroit, development for flight test of a speed density fuel distributor on a government-furnished L-[illegible] aircraft, Sept., 1950, $25,402.

Continental Electronics Ltd., Brooklyn, [illegible] equipment, Nov., 1950, $18,833.

Continental Motors Corp., Muskegon, Mich., type O-190 engines for L-16A aircraft, Aug., 1950, $12,571; engine parts, Dec., 1950, $123,658.

Cook Electric Co., Chicago, switch pressure, [illegible] fuel warning and pressure, emergency fuel, July, 1950, $9678.

Cooley Electric Manufacturing Corp., Indianapolis, electric steam and maintenance data, Oct., 1950, $18,719.

Cornelius Company, Minneapolis, air compressors, Dec., 1950, $74,756; air compressors, Sept., 1950, $12,974.

Craig Machine, Inc., Danvers, Mass., [illegible], Oct., 1950, $208,186.

Crescent Film Laboratories, Chicago, film reproductions, June, 1950, $10,000.

Curtis Auto Devices, Inc., Bedford, Ind., drain valves, Oct., 1950, $4120.

Curtiss-Wright Airplane div., Curtiss-Wright Corp., Columbus, Ohio, modification of one government-owned constant velocity servo simulator, Sept., 1950, $9950; reconditioning of B-26A aircraft, Mar., 1951, $6,888,000; overhaul of auxiliary power units, Mar., 1951, $248,000.

Curtiss-Wright Propeller div., Curtiss-Wright Corp., Caldwell, N. J., propeller assembly and spinner assembly controls for [illegible]-33 engine test stand, Mar., 1951, $52,768; propeller assemblies and 18 slip ring housing assemblies for support of C-121 aircraft, Feb., 1951, $276,160; installation and spare propeller assemblies, controls, spare blade assemblies and spare parts for B-36 airplanes, June, 1950, $4,383,673; propeller spinner and control spare parts for B-36 series aircraft, June, 1951, $1,125,800.

Da-Lite Screen Co., Inc., Chicago, projection screens, July, 1950, $7297.

Dake Engine Co., Grand Haven, Mich., press arbors, Nov., 1950, $8461.

Darling, L. A., Co., Bronson, Mich., [illegible] board assembly, Sept., 1950, $16,650.

Davies Laboratories, Inc., Riverdale, Md., magnetic analyzers and engineering data and handbooks of operation and service instructions, Mar., 1951, $82,780.

Davison Chemical Corp., Baltimore, dehydrating agent, Sept., 1950, $77,440.

Dayton Aircraft Products, Inc., Dayton, hand operated heater, Jan., 1951, $53,774; [illegible] and tension [illegible], Sept., 1950, $13,555.

Delco Products div., General Motors Corp., Dayton, motor assembly handbook data, July, 1950, $10,185.

Deluxe Co., Los Angeles, [illegible], June, 1950, $50,[illegible].

Denison Engineering Co., Columbus, Ohio, hydraulic test stand and maintenance data, engineering data and [illegible] packaging, Dec., 1950, $178,098.

Detroit Bolt and Nut Co., Detroit, [illegible] bolts, Sept., 1950, $2469.

Dictaphone Corporation, [illegible], recorder reproducers, July, 1950, $73,431.

Douglas Aircraft Co., Inc., Long Beach, Calif., spare parts for maintenance of C-74 aircraft, Dec., 1950, $11,945.

Douglas Aircraft Co., Inc., Santa Monica, Calif., miscellaneous equipment items, Feb., 1951, $20,414; [illegible], Dec., 1950, $12,000; [illegible] test pedestals, Apr., 1951, $46,760; and spare parts for maintenance of [illegible] aircraft, Dec., 1950, $12,000; [illegible] maintenance of B-26 aircraft, Dec., 1950, $19,101; spare parts for maintenance of C-54 aircraft, Dec., 1950, $26,000; spare parts for maintenance of C-47 aircraft, Dec., 1950, $12,000; spare parts for maintenance of C-47 aircraft, Dec., 1950, $22,813.

Duffy Construction Co., Cleveland, construction and maintenance of Government Aircraft Plant No. 1, June, 1950, $16,000; construction and maintenance of Government Aircraft Plant No. 2, June, 1950, $16,188.

Dumont Aviation Supply Co., Long Beach, Calif., [illegible], Sept., 1950, $31,089.

Durham Aircraft Service, Inc., Woodside, N. Y., [illegible] aircraft engines and [illegible] accessories, Feb., 1951, $41,888.

Eastern Rotorcraft Co., Willow Grove, Pa., tie-down devices, Oct., 1950, $43,566.

Eastman Kodak Co., Rochester, N. Y., photographic film and paper, Sept., 1950, $97,887; photographic film, Aug., 1950, $4261; photographic film, paper and plates, July, 1950, $4751; photographic film, June, 1950, $27,169; photographic film, Sept., 1950, $4025; engineering data for [illegible], Feb., 1951, $75,607; [illegible], Aug., 1950, $6748.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., [illegible] aircraft generators, Dec., 1950, $77,470; fuel pressure indicators, Dec., 1950, $5401; [illegible], Dec., 1950, $4437; pressure indicators and transmitters, Dec., 1950, $16,772; fuel flow transmitter, Dec., 1950, $19,458; fuel flow indicator, Dec., 1950, $3111; aircraft starters, Dec., 1950, $74,564; type J-8 indicator, Sept., 1951, $2,011,033; starter assembly, Dec., 1950, $187,684; multi-purpose pressure indicators, Dec., 1950, $16,506; multi-purpose transmitter, Feb., 1952, $57,897; pressure indicators and transmitters, Oct., 1950, $24,736; [illegible] bearings, [illegible] holders, spring [illegible], drive shaft tools, Oct., 1950, $9922; type [illegible] fuel pressure indicators, Aug., 1951, $17,108; type [illegible] oil pressure indicators, Sept., 1951, $18,668.

Economy Die Stamping Co., Grand Rapids, Mich., metal shipping containers, Sept., 1950, $5036.

Edo Corp., College Point, N. Y., float and strut assemblies, Mar., 1951, $243,716.

Elcor Inc., Chicago, modification of [illegible], June, 1950, $141,200.

Elastic Stop Nut Corp. of America, Union, N. J., aircraft nuts, Aug., 1950, $5973; nuts, Sept., 1950, $7535; nuts, Aug., 1950, $24,151.

Electric Auto-Lite Company, Port Huron, Mich., cable, aircraft low tension, Sept., 1950, $23,825.

Electric Auto-Lite Company, Toledo, Ohio, spare parts for A-1 motors, D-6 powerplants, [illegible] cranes, C-2 and F-1 truck tractors, Oct., 1950, $15,491.

Electric Hotpack Co., Inc., Philadelphia, [illegible] oven and maintenance data, Oct., 1950, $15,700.

Electric Storage Battery Co., Cleveland, aircraft storage battery, Aug., 1950, $15,406.

Elliott, B. K., Co., Cleveland, [illegible] cabinets, Aug., 1950, $21,063.

Erie Manufacturing Company, Milwaukee, container assembly, Dec., 1950, $19,416.

Esper Mfg. Co., New York, [illegible] generator, Oct., 1950, $21,855.

Essex Wire Corp., Fort Wayne, Ind., low tension aircraft cable, Sept., 1950, $79,293.

Everybodys Office Outfitters, Inc., Dayton, blueprint filing cabinets, July, 1950, $4712.

Fafnir Bearing Co., New Britain, Conn., ball bearings, Aug., 1950, $5477.

Fairchild Aircraft div., Fairchild Engine and Airplane Corp., Hagerstown, Md., [illegible] machines, Jan., 1951, $22,344; kits for overhead panel; add two spotlights for radio controls on pedestal on C-119B and C aircraft and kits for main landing gear shock strut, add metering pin on C-119B and C aircraft, Aug., 1950, $26,[illegible]; kits to cover modification of C-119B [illegible] training units, Aug., 1950, $6917.

Fairchild Camera-Instrument, Jamaica, N. Y., spare parts for K-[illegible] camera, Aug., 1950, [illegible]; spare parts for aircraft cameras, Mar., 1951, $18,903; aerial cameras, Dec., 1950, $74,979; [illegible] box, Dec., 1950, [illegible].

Farrel-Birmingham Co., Buffalo, [illegible], 1950, $18,000.

Federal Aircraft Works, Minneapolis, [illegible] parts, Oct., 1950, $11,000.

Federal Brush Corp., New York, [illegible] brush, Aug., 1950, $5548.

Federal Motors Truck Co., Detroit, spare parts for [illegible] truck [illegible], Dec., 1950, $18,852.

Federal Supply, Bureau of, Cleveland, [illegible], July, 1950, $18,948.

Federal Telecommunications Labs., Nut-

ton, N. J., long-range two-way air-to-ground communications system, July 1951, $51,919.

Feisenthal, G., Sons, Chicago, computers, Jan., 1951, $31,810.

Fenwal, Inc., Ashland, Mass., thermal fire detector switch assembly, June, 1950, $12,872.

Filtrol Corporation, Los Angeles, dehydrating agent, Sept., 1950, $16,224.

Firestone Tire-Rubber Co., Akron, change loading system from mechanical type to hydraulic type, Feb. 1951, $1966; airplane casings and tubes, Aug. 1950, $11,949.

Flexible Tubing Corp., Branford, Conn., flexible tubing and spare parts, Sept. 1950, $56,581.

Flightex Fabrics, Inc., New York, mercerized cloth and cotton, Jan. 1951, $28,807.

Fogarty Electric Company, Cheyenne, additional work in connection with installation of electrical facilities, Sept. 1950, $17,380; painting auxiliary equipment in two outdoor substations, Sept. 1950, $4944.

Foster, L. W., Sportswear Co., Inc., Philadelphia, flying suits, Jan. 1951, $414,890.

Gade, Frederick, Norton, Conn., acoustic automations, June 1950, $21,410.

Gaertner Scientific Corp., Chicago, optical measuring equipment for gunsight test stand, Sept. 1951, $11,920.

Gaston Laboratories, Inc., [illegible] data analyzer, Jan., 1951, $9708.

General Electric Co., Bridgeport, Conn., low tension aircraft wires, July, 1951, $14,810.

General Electric Co., Dayton, ground fault indicating equipment, Dec., 1950, $11,810; starter generator assembly, engineering and maintenance data, Nov., 1950, $73,514; 28 volt lamps, Oct., 1950, $12,041.

General Electric Co., Schenectady, N. Y., services and facilities for project MX805, Sept. 1950, $9990; J47 aircraft engines, spare parts, overhaul tools and data, Jan. 1951, $3,410,961; 2 lifted turbosuperchargers and 1 barometric valve, Nov., 1950, $6742; CH7 turbosuperchargers, Dec. 1950, $181,458; modification kits for B-36 fire control systems, Dec., 1950, $148,744; I-16A turbine parts and data, June, 1951, $101,203; position indicator, type [illegible], 1950, 1951, $46,831; spare parts for J-47 aircraft engines, Nov., 1950, $188,331; 10 type C-11 turbo regulators, Sept., 1950, $9764; industrial motorized, [illegible] [illegible] planning window, Nov., 1950, $792,928.

General Electric Co., Syracuse, N. Y., modification kits for AN/APG equipment, Dec. 1950, $21,417; antenna subassemblies and engineering data, Nov., 1950, $36,012; radar C-[illegible]-APG-1, Dec. 1950, $25,850.

General Electric Supply Corp., Dayton, lamp assembly, May, 1950, $18,774.

General Mills, Inc., Minneapolis, electronic package testing, Jan. 1951, $9800.

General Radio Co., Cambridge, Mass., distortion and noise meter, Dec., 1950, $26,414; stroboscope, Sept. 1950, $6552.

General Serv. Adm., Cleveland, office equipment, Jan., 1951, $20,000; office equipment, typewriters, adding machines, calculators, etc., May, 1950, $16,044.

General Serv. Adm., Washington, [illegible] tow panels, July, 1950, $10,000; [illegible] [illegible], Aug., 1950, $11,400.

General Textile Mills, Inc., New York, container assembly, Oct., 1950, $12,750.

General Tire and Rubber Co., Akron, airplane casings and tubes, Aug. 1950, $48,510; casings, Apr., 1951, $100,561.

Gibbs div., George W. Borg Corp., Delavan, Wis., filters for radio sets, Jan., 1951, $14,128.

Gilfillan Bros., Inc., Los Angeles, amplifier subassembly, [illegible] radio frequency unit, Dec., 1950, $13,822; maintenance, spare components and parts for AN/CPN-4 and FPN-10, Aug., 1951, $468,166.

Gisholt Machine Co., Madison, Wis., engine geared turret lathe, Sept., 1950, $17,114.

Globe-Wernicke, R. E., Co., Washington, bookcase units, Aug. 1950, $14,571; bookcase, Jan., 1950, $21,464.

Goodall Fabrics, Inc., New York, waterproof fabric, Jan., 1950, $3882.

Goodrich, B. F., Co., Akron, wheels and brakes, June, 1951, $195,651; spare parts for wheels and brakes, Sept., 1950, $21,858; truck axles, July, 1950, $62,368; deicer boot installing tool, Nov., 1950, $18,848; 9 sets of thick skin fuel cells for F-86, Apr. 1951, $44,729; tail wheel assembly, Dec. 1950, $8790; brake assembly, Oct., 1950, $8218; airplane casings, Jan., 1952, $212,145; airplane tubes, Jan., 1951, $16,872; nose wheels, Feb., 1951, $7634.

Goodyear Aircraft Corp. div., Goodyear Tire-Rubber Co., Akron, analog computer and recorder amplifier, Nov., 1950, $16,271; research to determine feasibility of using thermosetting transparent material, Mar. 1951, $15,000; non-linear computing rack and accessories, Nov., 1950, $14,700; engineering changes on plotting board, Jan. 1951, $18,543.

Goodyear Tire-Rubber Co., Inc., Akron, wheels and brakes, Jan., 1951, $45,826; wheels and brakes, Mar., 1951, $158,892; wheel assembly, Dec., 1950, $16,461; nose wheels, Dec., 1950, $5166; airplane casings, Sept., 1950, $151,451; airplane casings and tubes, Sept., 1950, $120,221; casings and tubes, June, 1951, $62,278; casings, Dec. 1951, $17,231; nose wheels, Feb., 1951, $6492.

Gould Storage Battery Corp., Trenton, N. J., battery, tanks, July, 1950, $7233.

Grand Central Airport Co., Glendale, Calif., overhaul of type aircraft engines and spare accessories, July, 1950, $42,027.

Grant Photo Products, Inc., Cleveland, one and special photographic paper, Sept. 1950, $17,800.

Great Lakes Garment Mfg. Co., [illegible] Mich., [illegible] B-2 flying suits, Dec., 1950, $78,210.

Great Lakes Mfg. Corp., Cleveland, components of MK-50-A1 and MK-51-A1 parachuting kits, Aug., 1950, $6800.

Greer Hydraulics, Inc., Brooklyn, [illegible] pump test stand assembly and maintenance data, Aug., 1950, $4800; engine stand assembly, engineering and maintenance data, Aug., 1950, $117,688; gunsight boresight test stand, Dec., 1950, $6,000; development of a flasher-hydraulic pressure portable, Aug., 1951, $14,175.

Hamilton Standard Propeller div., United Aircraft Corp., Hartford, Conn., modification of C-97 propeller [illegible] assemblies, June, 1950, $4299.

Hand, John H., Sons Co., [illegible], N. J., [illegible] wiper blades, Aug., 1950, $9880.

Harnischfeger Corp., Milwaukee, [illegible] [illegible], Feb., 1951, $179,212.

Harrison Brad. Co., Oak Park, Ill., [illegible] [illegible] for P-4 aircraft, [illegible], 1950, $9989.

Hart, Frederick, Co., Dayton, recorder, Aug., 1950, $41,900.

Hartman Electric Mfg., Mansfield, O., reverse current relays, Nov., 1950, $10,748; motors and generator [illegible], [illegible], 1950, $9880.

Harvard University, Cambridge, study of [illegible] [illegible] as it relates to [illegible] [illegible], Mar. 1952, $90,000.

Hawks, R. A., Co., Santa Monica, Calif., production parts for oxygen masks, Nov. 1950, $47,475.

Hazeltine Electronics Corp., Little Neck, N. Y., radar set, June, 1951, $21,281; tuned assemblies, Dec., 1950, $45,016.

Heil Company, Milwaukee, spare parts for F-2 and F-18 fuel servicing trailer, D-2 [illegible], [illegible], 1950, $72,459.

Hendey Machine Co., Torrington, Conn., geared head engine lathe, Feb., 1951, $10,912.

Herrenfeld, Frank, Engrg., Los Angeles, [illegible] [illegible] equipment (Aviation Navy), June, 1950, $7912.

Hoer Horr Electric Co., Milwaukee, [illegible] [illegible] machine, Oct., 1950, $10,872; maintenance and engineering data, Dec., 1950, $5085.

Hilliker Instrument, New York, [illegible] film reader, Mar., 1951, $15,891.

Hobart Bros. Co., Troy, Ohio, portable arc welder and [illegible], data, May, 1951, $66,300.

Holley Carburetor Co., Detroit, carburetor spare parts for B-25 aircraft, June, 1950, $17,382.

Houston Corp., Los Angeles, film processing machines, Aug., 1950, (Aviation Navy), $10,442; processing machine, Aug., 1950, $39,985.

Hughes-Simonson Engrg. Co., Dayton, ventilating system, Oct., 1950, $28,900.

Ideal Electric Mfg. Co., Mansfield, O., [illegible] [illegible] [illegible] assembly, [illegible] [illegible], 1950, $28,900.

Independent Engr., O'Fallon, Ill., [illegible] [illegible], Mar., 1951, $28,100.

Independent Glove Co., Chicago, [illegible] leather gloves, Aug., 1950, $1280.

Ingersoll-Rand Co., Cincinnati, [illegible] [illegible] control switch, Aug., 1950, $10,788.

International Business Machine, Dayton, tabulating machines and devices, June, 1950, $662,806; same, Aug. 1950, $9844.

Irving Air Chute Co., Buffalo, type [illegible] harness assembly, Oct., 1950, $13,250.

Jack-Heintz Precision Industries, Cleveland, [illegible] [illegible] parts and [illegible], Dec., 1950, $8,000; [illegible], Sept., 1950, $15,809; [illegible] [illegible] starters from model [illegible] to [illegible], Aug., 1950, $34,500; [illegible] kits, Aug., 1950, $1772; type [illegible] [illegible] [illegible], [illegible], Nov., 1951, $13,000.

Jamestown Metal Corp., Jamestown, N. Y., office furniture, Aug., 1950, $6940.

Janke and Co., Inc., Hackensack, N. J., [illegible] [illegible] [illegible], Dec., 1950, $22,[illegible]; [illegible] [illegible] [illegible] assembly, Dec., 1950, $12,858.

Jay Dee Tool Engr. Co., [illegible], Ill., [illegible] [illegible], Aug., 1950, $17,161; [illegible] [illegible], Aug., 1950, $11,400.

Kearfott Co., Inc., New York, [illegible] [illegible], Aug., 1950, $34,900.

Kellett Aircraft Corp., [illegible] [illegible] [illegible] [illegible] [illegible], Jan., 1951, $7180.

Keys Electric Co., [illegible], Ohio, [illegible], 1950, $47,500.

Kidde, Walter, and Co., Belleville, N. J., container assembly, Dec., 1950, $16,944; [illegible] [illegible] and [illegible] data, Oct., 1950, $13,720.

Kings Electronics Co., Tuckahoe, [illegible], Jan., 1951, $8288; [illegible] assembly, [illegible], 1950, $4125.

Kingsley Stamping Machine Co., Hollywood, design, fabrication and assembly for [illegible] [illegible] machine, Jan., 1951, $11,070.

Kinsey, E. A., Co., Cincinnati, sheet metal brake and [illegible] [illegible], Sept., 1950, $9712.

Koch, George, Sons, Inc., Evansville, Ind., [illegible] and maintenance data, Oct., 1950, $16,335.

Koehler Aircraft Products, Dayton, [illegible] [illegible], July, 1950, $6300.

Kollsman Instrument div., Square D Co., Elmhurst, N. Y., [illegible] indicator, type [illegible], Aug., 1951, $178,248.

Lamson and Sessions Co., Cleveland, [illegible], 1950, $12,307.

Laurel Lamp Mfg. Co., Newark, N. J., lamp assembly, June, 1950, $9880.

Lavoie Laboratories, Morganville, N. J., [illegible], June, 1951, $31,420.

Lear, Inc., Grand Rapids, Mich., [illegible], Aug., 1950, $4710.

Lempco Product, Inc., Bedford, Ohio, [illegible] [illegible], Nov., 1950, $3300.

Lewis Engineering Co., Naugatuck, Conn., thermocouples, Nov., 1950, $9887; type [illegible] temperature indicator, Dec., 1951, $6200; temperature indicator, Apr., 1951, $7190.

Lewyt Corp., Brooklyn, [illegible] [illegible], Nov., 1950, $30,411.

Lieb-Jackson Co., Dayton, [illegible] and [illegible] [illegible] system, Aug., 1950, $7181.

Linde Air Products Co., New York, liquid [illegible] nitrogen [illegible] nitrogen, June, 1951, $108,000.

Linen Thread Co., Paterson, N. J., [illegible], Aug., 1950, $12,768.

Liquidometer Corp., L. I. City, N. Y., spare parts for instrument, June, 1950, $25,867; tank units and indicators, Feb., 1951, $12,539.

Lite Mfg. Co., New York, helmets, Jan., 1950, $10,250.

Lockheed Aircraft Corp., Burbank, Calif., spare parts for T-33A airplanes, Oct., 1951, $686,236; spare parts for F-94B aircraft, Apr., 1951, $1,359,844; design and install refinements for manufacturing of airframe components or parts for a fighter type airplane, Aug., 1951, $188,446; spare parts for F-80 aircraft, June, 1950, four contracts $21,712, $9628, $10,665, $12,217.

Lorenzo Del Riccio Labs, Los Angeles, projector, Sept., 1950, $11,555.

AIR TRANSPORT

War Needs May Hit Bargain Rates

Meanwhile, ten-fold air coach rise, while regular traffic drops, pushes carriers ahead of last year.

Air coach and other bargain fares may be the first victims of any further demands by the military for certificated airline planes.

Together with first-of-the-week family fares and excursion rates, air coach is promotional. If a further squeeze develops on airline equipment, these will be used for special traffic generating tariffs.

Certificated airlines use four-engine planes exclusively for their air coach services. That's the only type of equipment being sought by the military. Besides, family fares, excursion rates and air coach rates extension to passengers who would be "non-essential" riders during an emergency.

▶**Why Take Less?**—High-capacity air coach planes would be much in demand if seat space tightened up severely. But since the carriers could easily fill all the seats with 6-cents-a-mile passengers, the temptation to eliminate 4- or 4½-cents-a-mile tariffs is obvious.

Even some of air coach's most ardent boosters have been looking askance at the service recently. Northwest Airlines has already disclosed plans to boost coach fares. Whether increased traffic at coach rates bolsters revenue but through diversion of first-class business is still the subject of hot argument by the carriers and government officials.

Civil Aeronautics Administration traffic analysts, in a privately circulated memorandum, said recently that "evidence of increasing diversion of regular fare passengers to coach flights is apparent."

▶**Coach Up Ten-Fold**—During the first four months of 1950, total revenue passenger miles flown by domestic scheduled carriers increased 18 percent over the same 1949 period—rising from 1,873,762,000 to 2,216,612,000. But regular-fare traffic alone fell off from 1,949,040,000 passenger miles to 1,918,999,000 passenger miles.

Ten-fold increase in coach traffic is recorded for the same span. Coach revenue passenger miles numbered only 24,322,000 in the first four months of 1949 but soared to 246,613,000 in the same period this year. By last April, the certificated domestic airlines' coach business represented 12 percent of their total passenger miles flown.

Overall domestic airline passenger load factor during April, 1950, was about the same as in the same 1949 month. However, 75 percent of the low-priced coach seats were filled last April, compared with only 58 percent of the regular-fare seats.

▶**Railroad Headache**—The railroads are really worried over the air coach threat. While airlines were offering fare savings through coach expansion, the railroads boosted rates.

Result is that the decline of both first-class and coach business has continued steadily since 1946. During the first quarter of 1950, the nearly 10 percent gain in airline passenger traffic contrasted with a 16 percent drop in railroad parlor and coaching car patronage.

Whereas the airlines handled 43.1 percent of combined air and rail fare traffic in 3-6 months 1948, the proportion jumped to 49.7 percent in the same period this year.

▶**Low Blows Seen**—Air coach is hitting the railroads' passenger business "at the breakdown," according to the Federation for Railway Progress. Who's where the federation, founded by Chesapeake & Ohio Railway's outspoken board chairman, Robert R. Young, thinks the airlines' low fare rates are most responsible for some blows below the breakdown?

Origin of air coach, CRP states, was with old equipment operated by tail-chasers on a shoestring and with irregular and often inconvenient schedules. Now, the federation complains, air coach is big business, with the certificated airlines operating the newest and fastest equipment on regular schedules between most domestic traffic centers.

▶**CAB the Culprit**—The Civil Aeronautics Board is regarded as the culprit who let the evil genie out of the bottle. CAB's policy appears to be to get the business no matter how much it costs, and the taxpayers will straighten everything out later," CRP declares. It defines air coach as "airplane service at railroad fares."

Fourth-class air coach is cheaper than first-class rail fares plus charges for lower berth on a Pullman. In some cases, it is also cheaper than rail coach, besides providing substantial time savings.

▶**Fares Compared**—The Federation states that between New York and Chicago, the lowest certificated airline coach fare is $27.60 one-way, compared with $50.71 for rail coach and $43.64 for Pullman with lower berth. Air coach is also cheaper than rail coach from New York to Cleveland, Detroit, Milwaukee and Pittsburgh. On the transcontinental run from New York to Los Angeles, the $110 coach fare claimed by TWA and American Airlines compares with $72.32 by rail coach and $134.43 for Pullman with lower berth.

Railroad streamliners such as Southern's "Silver Meteor," New York Central's "Twentieth Century," Southern's "Southerner" and Southern Pacific's "Daylight" will be the first to feel the punch from air coach, according to the airlines' federation. "Air Coach," it concludes, "is a new technique to promote an old policy of cream skimming."

▶**Complaint Rejected**—Chicago & Eastern Illinois Railroad, which operates the "Dixie Flyer" streamliner from Chicago to Miami, has made the

BEA STARTS PROPJET AIRLINER SERVICE

First scheduled airline service use of a gas turbine propeller transport was scheduled by British European Airways for July 29 when the four-engine Vickers Viscount was to make the line's regular London-Paris round trip and return. The Viscount was then to be used for crew training until Aug. 7 when it would go again on the London-Paris run for two weeks to help handle the August holiday rush. Viscounts are scheduled to go into full operation with BEA in 1952. The craft has four Rolls-Royce Darts and can seat 40 passengers. A number has been ordered for BOAC for Caribbean service.

only formal complaint to CAB against air coach. It said that Eastern Air Lines and Delta Air Lines' Chicago-Miami coach tariffs would result in revenues below the cost of operations, adding that the Civil Aeronautics Act, properly construed, prohibits such fares. CAB approved the tariffs despite the railroad objection.

How much revenue has air coach diverted from the rails? The surface carriers aren't sure, but estimate it at "hundreds of thousands of dollars."

The federation cites a CAB survey showing that almost 31 percent of the air coach travelers in April and May, 1949, were diverted from the railroads. And between San Francisco and Los Angeles (where air coach is in full flower), the Southern Pacific's morning and noon "Daylights" lost 8.7 percent of their passengers during first-half 1949, while competing airline passenger traffic gained 17.2 percent.

▶ **Worry Over Airlines**—FRP thinks that air coach is here to stay, even though its low fares place the airlines' financial strength in jeopardy. The federation (which sometimes doesn't see eye-to-eye with the Association of American Railroads) thinks the railroads must counter attack now, both with improved equipment and service.

"Too often," FRP warns, "the railroads have seen, without applying the lesson, that a full train of passenger-miles passengers will produce a higher net return than a half-empty one at current coach fares." The federation noted that despite three coach fare increases since 1946, which brought the level from 2.2 to 2.375 cents a mile, Eastern railroads suffered a persistent decline in passenger traffic and revenue.

Navigator Shortage Hits Pacific Airlift

A severe shortage of qualified navigators is plaguing commercial airlines participating in the Pacific airlift under contract to the military.

As a result, the Civil Aeronautics Board has promulgated a special Civil Air Regulation authorizing limited flight navigator certificates. Object is to tap the large pool of former military navigators who have not obtained certificates for commercial operations.

▶ **Full Test Deferred**—Applicants for limited certificates must have served on active duty as a rated military navigator for at least six months since Dec. 7, 1941. They must demonstrate to CAA their competence to navigate aircraft, but they will not be required to pass the full written test for an unlimited navigator's certificate for three months.

The limited certificate will expire three months, and can not be renewed. Operators possessing the limited navigator will be permitted to serve only on airline operations conducted pursuant to contracts with the Defense Department.

CAA has issued more than 800 regular flight navigator certificates since Aug. 1947. But airlines had have gone to crewmen who are also pilots.

Surveys showed that comparatively few qualified navigators were available for the emergency airlift. Federal regulations require the airlines to include navigators in their crews on long over-water hops.

▶ **Training Program**—American Airlines, which has made several of its DC-4s available for the Pacific airlift, is accepting applications for navigator posts. Candidates must have 500 actual hours of aerial navigation experience, either commercial or military, and must be physically qualified.

Acceptable candidates will be given transportation to the West Coast, where they will undergo training in a navigation school operated by Pan American Airways. They will draw salary during the training. Candidates failing to complete the training course will be given return transportation to point of origin.

Feeder Exec Pay Bumps CAB Ceiling

Feederline executives who want to earn more than $12,000 annually may have to change jobs.

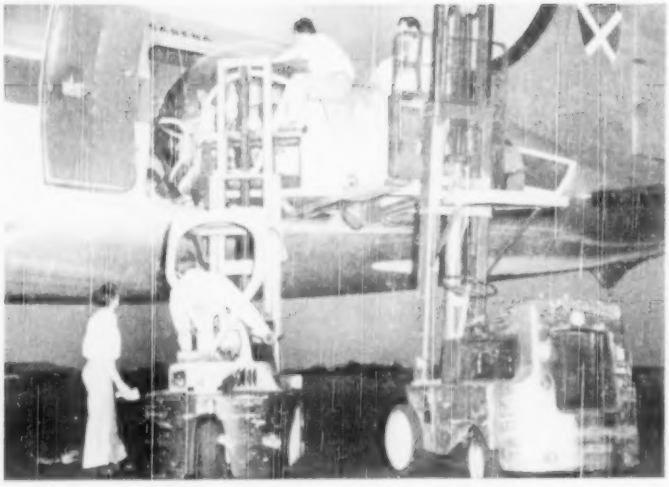
The Civil Aeronautics Board, in tentatively setting new mail rates for Trans-Texas Airways, disallowed the portion of President R. L. McKaughan's salary which exceeds $12,000. McKaughan was paid $22,498 last year and $23,000 in 1948, with a small part of expense being allocated to the company's Sale and Service division.

▶ **Ruling Explained**—CAB said it does not question the integrity or the value of the services of the TTA president from the viewpoint of the carrier's stockholders. But, it concluded, "where the carrier relies so heavily on mail pay support, we believe that for rate-making purposes the maximum salary which should be underwritten by the government is $12,000 per year."

McKaughan was the highest-paid feederline executive last year. Runner-up was All American Airways President Robert Love, who received $15,000.

CAB tentatively increased TTA's mail pay for back periods to permit the carrier to show a 7 percent profit on its assignedinvestment. The mail rate per plane mile was boosted from 57 cents to 65 cents.

A proposed incentive sliding scale mail rate for the future will permit Trans-Texas to break even at a passenger-load factor slightly in excess of 22 percent.



SABENA PICKS UP AIRMAIL COPTERS

Two Bell 47D1 helicopters to be used by Sabena for air mail pickup and delivery service in Europe are loaded into one of the airline's DC-4 cargo planes at Idlewild for transport to Belgium. The Brussels copter route will be operated by Sabena under contract with the Belgian post office. Daily stops will be made at Libramont, Liege, Tongres, Hasselt, Beringen, Tienhout, Heusden, Antwerp and back to Brussels. The service is expected to make possible 24-hr. New York-Belgium airmail deliveries.

Rooftop Heliport for Los Angeles

Los Angeles is to get a rooftop passenger heliport on top of a twelve-story downtown building.

The heliport will be financed by the Pacific Mutual Life Insurance Co. and be located on the firm's building at Sixth and Grand. Los Angeles Airways, which now operates certificated mail and express helicopter service, will lease the rooftop facilities. LAA has already applied to the Civil Aeronautics Board for authority to operate passenger helicopters in and around the Los Angeles area.

▶ **Six Minutes to Airport**—Plans for the heliport include a luxurious lapatory passenger lounge reached by express elevator and connecting directly with the helicopter landing area by escalators. Air passengers would be able to reach Los Angeles International Airport from the downtown rooftop in six minutes. Connections would be timed for all major airline schedules.

LAA President Clarence M. Belinn foresees an eventual web of passenger heliports throughout Southern California. Pasadena is already making plans for a passenger helicopter terminal.

Belinn has expressed interest in helicopters designed to seat 12-20 passengers. The company's two-year-old mail service is conducted with Sikorsky S-51s.

Modern Exemption Denied by CAB

Modern Air Transport, one of the best known nonscheduled operators on the Eastern seaboard, has been denied an unlimited exemption which would have permitted it to continue its irregular service.

The Civil Aeronautics Board said Modern had operated from New York to Miami, San Juan and Buffalo with excessive regularity. In January, 1948, at the request of CAA and CAB, a federal district court in New York issued an injunction prohibiting the company from engaging in other than irregular operations.

▶ **Record Cited**—Modern has been active since 1947. During the first quarter of this year it made 82 flights between New York and Miami, and 16 between New York and San Juan. The carrier owns two DC-3s but has also been using DC-4s. Its business has been generated principally through ticket agencies, including 26 in the New York area alone.

CAB said Modern had demonstrated such a disregard for compliance with Board regulations that it is not in the public interest to entrust the company with authority to render irregular air service. The Board's order is to be effective on Aug. 12 unless Modern requests reconsideration or a hearing.

CAA Consolidates Air Facilities

The Civil Aeronautics Administration has announced consolidation of airport traffic control towers and airway communications stations at 16 municipal airports. The order followed tests at Lynchburg, Va., and Colorado Springs, Colo., airports where the combined operation was found satisfactory.

Other airports in the consolidated status will include: Augusta, Ga.; Big Spring, Tex.; Bismarck, N. D.; Brownsville, Tex.; Burlington, Vt.; Columbia, S. C.; Duluth, Minn.; Helena, Mont.; Paducah, Ky.; Portland, Me.; Sioux City, Ia.; Sioux Falls, S. Dak.; Topeka, Kans.; and Tri-City Airport, Tenn.

The consolidation is limited to airports which have normally had more than 5000 landings or takeoffs per month of all types of planes. Communications stations, including all communications equipment except that which can be operated by remote control, will be moved into the tower. The combined arrangement will require training of operators to be qualified both as communication and traffic controllers. A program for training combination operators is being established by CAA.

Troubleshooter for El Presidente

A special "troubleshooter" C-46 cargo plane has been assigned to watch over Pan American World Airways' newly inaugurated El Presidente flights between New York and Buenos Aires.

The plane contains a complete spares package, including a Pratt & Whitney R-4360 engine with propeller and accessories, and, it which is $127,000, PAA says. Also aboard is all the equipment for handling the 5300-lb. powerplant, a Bendix super for loading a dolly and an repaired ground tools.

Based at Rio de Janeiro, the C-46 is manned by a pilot, engineer and two engine mechanics, who are on call at all hours.

Seattle Crash Suit

The 19th damage suit in the Seattle Air crash of the crash one year ago at Seattle Boeing Field of a remodeled mail airline being damage sought to more than $100,000.

Named as defendants in the latest action for $11,000 are Air Transport Associates, Inc., Air Transport Associates Sales Co., Inc., and Air Line Services, Inc. The suit has now in name both the service airlines and ticket selling corporations as defendants.

Seven persons were killed when the plane, with 32 persons aboard, struck electric wires and crashed in a residential area. Suits following followed.

Braniff Posts Profit

Braniff Airways turned in a $402,000 net profit during the first six months of 1950, and President T. E. Braniff has predicted an equally profitable second half.

This year's earnings compare with an $18,700 loss during the same 1949 period. Operating revenues exceeded last year's figure by $1,217,000, although expenses also increased by $785,000. Revenue passenger mileage was up 6.5 percent.

Recent leasing of a DC-4 for military service in the Pacific is not expected to affect the carrier's earnings adversely.

AMERICAN'S SOUTHERN HEADQUARTERS

Artist's sketch shows the $2 million combination hangar and office building which American Airlines will erect at the new Greater Fort Worth International Airport. Construction is expected to start this month, with completion scheduled for September, 1951. The building will be 305 ft. wide by 225 ft. deep, providing 40,750 sq. ft. of hangar area adjoined by 45,700 sq. ft. of shop, maintenance and office area. Hangar portion of the building will have a structural system of built-up steel arches providing a clear span opening of 235 ft. American's southern regional operations and sales headquarters will be located in the office area. Associated architects for the combination hangar and office structure are Joseph R. Pelsch and Preston M. Geren.

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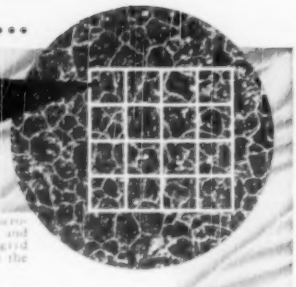

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Venezuela Begins Airport Work

(McGraw-Hill World News)

Caracas—Grading and drainage have been started by the Venezuelan Ministry of Public Works at Palo Negro, where a giant airport is to be built in the next few years. It will have two 10,000-ft. runways, costing an estimated $10 million. A large terminal and several hangars are also included in the project, scheduled for completion by 1955.

At the same time, a longer runway at Maiquetia, the international airport serving Caracas, is under construction. This new runway, scheduled for completion before the end of this year, will be 2 mile long and 165 ft. wide. Its tension asphalt-covered pavement is being designed to take the heaviest commercial aircraft.

TTA Feeder Route

Trans-Texas Airways has received Civil Aeronautics Board authorization to operate an additional feeder route from Mission-McAllen-Edinburg, Tex., to San Antonio and Victoria, Tex., via Alice, Corpus Christi and Breville. CAB denied the applications of Val-Air Lines, Inc., to conduct service from Texas points in the lower Rio Grande Valley to San Antonio and Houston.

Grand Canyon Copter

Helicopter service from an asbestos mine site within the Grand Canyon in northern Arizona is being operated by Allomo Helicopter Service. The mine is patented land, staked out in 1903, and is the only place an aircraft is authorized to land within the park grounds. Now used as a sightseeing medium, it is planned to carry ore out of the canyon within a year.

SHORTLINES

▶ All American—Has asked the Civil Aeronautics Board for new routes between Williamsport, Pa., and Cleveland, O., via Bradford, Pa., Jamestown, N. Y., and Erie, Pa.; between Scranton-Wilkes Barre, Pa., and Hagerstown, Md., via Hazleton and Harrisburg, Pa.; and between Cleveland and Cincinnati via Mansfield, Marion, Columbus and Springfield, O.

▶ American—Plans to step up its cargo sales effort despite the transfer of seven DC-4 airfreighters to the Pacific airlift. Company's six remaining airfreighters will serve 16 cities instead of 20 as formerly, but gain use of space on

combination passenger-cargo planes will be sought. In May and June, when AA carried close to 3 million ton miles of freight monthly, 55 percent was handled aboard passenger-carrying DC-6s and Convairs.

▶ **Braniff**—First half 1950 freight revenues were up 188 percent international and 62 percent domestic over the same 1949 period.

▶ **British Overseas Airways**—Plans to convert its fleet of Dakotas (DC-3s) into "Super Dakotas" through cockpit and instrument standardization, better soundproofing, addition of built-in passenger steps, and other improvements. Thirty-three seats will be available on short runs instead of the usual 28. Radio officers will no longer be carried, permitting a $280,000 annual saving. BEA expects its "Super Dakotas" to be in service another 5 or 6 years.

▶ **Capital**—Is sending 10 engineers to the West Coast along with its two cargo C-54s it is using in the Pacific airlift. Company shops modified the planes by installing wing and fuselage tanks that increased fuel capacity from 1800 to 3700 gal. and range from 1650 to 3300 miles. Radio equipment was also modified for long-range service.

▶ **Central**—Has purchased three C-45's and has options on six more. The Ft. Worth carrier hopes to get CAB permission to use the transports on its certificated feeder routes. It now operates single-engine Beech Bonanzas.

▶ **Chicago & Southern**—Reported $145,207 net profit in first half 1950 against $290,651 profit in the same period last year. Earnings included $5725 on the international route to Venezuela and $142,452 domestically. Dividend of 20 cents a share payable Aug. 15 was declared. ... First of five new Constellations will be delivered shortly. They will go in service in October on Chicago-Houston and Chicago-Memphis links.

▶ **Flying Tiger Line**—Says it is conducting its domestic scheduled freight operations "as usual" despite the use of company personnel and equipment in the Pacific airlift. ... Tigers and the Furniture Manufacturers Assn. of So. Calif. have formed an airfreight shipping pool to permit the furniture producers to dispatch 5000-lb. lots to Eastern markets at the new low specific commodity rates.

▶ **KLM**—Will attempt to restore its financial equilibrium in 1951 by means of sharp economies. The carrier suffered heavy losses last year, and the

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Dutch government does not intend to grant further subsidies.

▶ **Mid-West Airlines**—Carried 3272 passengers and 115,906 lb. of mail in its single-engine Cessna 190s during first-half of 1950. The feeder also completed 95 percent of its scheduled miles. Average passenger's trip was 144 miles.

▶ **Pan American**—Company's military operations to the Orient are now substantially larger than its commercial service on the Pacific.

▶ **Slick**—Reported a profit in June for the second straight month and achieved the first profitable quarter in its history. Company was in the red for first half 1950, but officials see a good chance that the deficit will be wiped out by year-end. Goal is 5,500,000 ton miles of freight monthly by December.

▶ **Transocean**—Has started work on a Navy contract calling for an estimated one million miles of bush flying and airlift in connection with exploration and development of petroleum reserves near Point Barrow, Alaska, on the Arctic Ocean. William L. Wood has been named general manager and director of operations for TAL's Arctic Circle flying. Company has recalled 90 airmen and 100 maintenance men for duty in connection with military flights in the Pacific.

▶ **Turner Airlines**—Has called on CAB to revoke Parks Air Lines' air carrier operating certificate. Turner, an applicant for Parks' routes, says PAL started service on its feeder system "in wilful violation of CAB's orders."

▶ **United**—Allison division of General Motors Corp. has advised UAL that it can't deliver turboprop engines for commercial use for three years. Current cost of one engine is about $115,000—more than the price of a new pre-war DC-3.

CAB SCHEDULE

Aug. 7—Prehearing conference on application of Compania Dominicana de Aviacion for foreign air carrier permit from Ciudad Trujillo, Dominican Republic, to San Juan, P. R., and Miami. (Docket 4861).

Aug. 7—Resumption of hearing in enforcement proceeding against Trans-American Airways, Great Lakes Airlines, Golden Airways, Edward Waite Tabor and Sky Coach Airways, Inc. (Docket 4161).

Aug. 7—Hearing in West Coast Airlines—Southwest Airways merger case. (Docket 1461).

Aug. 8—Hearing on Mid-West Airlines' 1951 week-end. (Docket 4633).

Aug. 14—Resumption of hearing on renewal of Southwest Airways' feeder certificate and service suspension at certain Pacific Air Lines points in the area. (Docket 1158 et al).

Aug. 16—Resumption of hearing on renewal of West Coast Airlines feeder certificate and service suspension at certain Pacific Air Lines points in the area. (Docket 1062 et al).

Aug. 17—Prehearing conference on Pan-Alaska mail rate case. (Docket 2764).

Aug. 18—Hearing in reopened case on additional California-Nevada service. (Docket 2014 et al).

Aug. 28—Hearing on CAB's enforcement action against Air Transport Associates. (Docket 4561).

Sept. 11—Hearing on Lehman Brothers' interlocking relationship case involving partners of firm holding airline directorships. (Docket 1006 et al).

Sept. 11—Hearing on enforcement proceeding involving interlocking relationship between Arrow Airways, Inc., and California Arrow. (Docket 4261).

Sept. 11—Hearing on applications of Aerovias "Q" and Compania Cubana de Aviacion for Havana-Washington-New York Service air carrier permits. (Dockets 3218 and 4197).

Sept. 18—Hearing on TWA and American Overseas Airlines requests to suspend service at Philadelphia on trans-Atlantic routes. Postponed from Aug. 7. (Docket 4268 et al).

Sept. 21—Prehearing conference on American Overseas Airlines' mail rate. (Docket 1066).

Sept. 26—Hearing on Mid-continent Airlines application to have the Route 40 order (Docket 3030) made permanent. (Docket 3030).

Oct. 9—Hearing on renewal of Frontier Airlines feeder certificate and service suspension at two United Air Lines stops in the area. (Docket 4540).

Oct. 9—Hearing in Latin American Airfreight case. (Docket 2448 et al).

Oct. 16—Hearing on Los Angeles Airways' application for renewal of its helicopter passenger certificate and for additional authority to carry passengers. (Docket 4064).

Jan. 8, 1951—Hearing in the Four-man reduction and CAB investigation of the carriers' economy and efficiency. (Docket 1141 et al).

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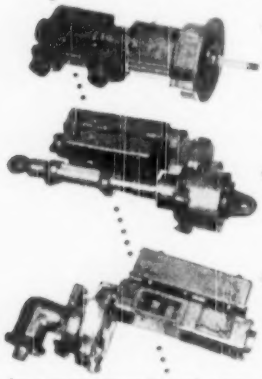

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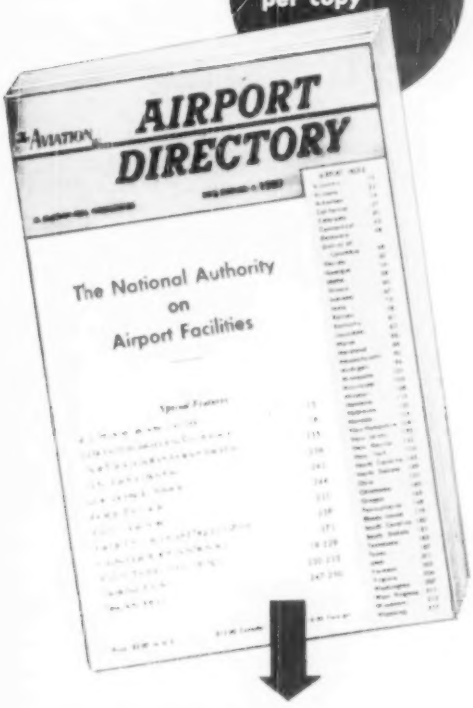

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If you're stumped by technical German (almost the official language of the missile industry) and the word happens to begin with any letter between A and K, you can find the English counterpart in the first, and only available, volume of the **German-English Technical Dictionary**.

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This dictionary, edited by Dr. Kurt F. Leidecker from data compiled by the U. S. Air Force, contains over 100,000 terms. In its present form, it is an expanded version of two interim editions of technical German which were issued by the Air Documents Division of the Air Force.

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The German-English Technical Dictionary is published and sold by S. F. Vanni, 30 West 12 St., New York City. Cost of both volumes is $35. D.A.A.

Service Manual

A new addition to Drake's Aircraft Mechanic Series, **Aircraft Engine Maintenance and Service**, has just been published by the Macmillan Co.

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What's Ahead in Congress

War Investigations

Congress will keep a close eye on the expanding war mobilization program.

The War Investigating Subcommittee, named last week by Chairman Millard Tydings of the Senate Armed Services Committee, will fill the role of the famed Truman Committee of World War II, whose harsh, and sometimes questionable criticism of the performance of aircraft manufacturers and Air Force officials in a few isolated cases was balanced by considerable helpfulness to the industry and the military in solving manpower, priority, and other problems.

Freshman Sen. Lyndon Johnson (D., Tex.), a lieutenant commander on the aircraft carrier Midway in the last war and an aggressive proponent of air power, heads the group, which includes: Sen. Virgil Chapman (D., Ky.); Sen. Estes Kefauver (D., Tenn.); Sen. Lester Hunt (D., Wyo.); Sen. Styles Bridges (R., N. H.); Sen. Leverett Saltonstall (R., Mass.), and Sen. Wayne Morse (R., Ore.)

On the House side of the Capitol, Chairman Carl Vinson's Armed Services Committee has already quietly moved forward in closed-door sessions with top defense officials to determine the reasons for the poor U. S. showing in Korea in the light of the $50 billion spent on defense over the past four years, the present status of the country's defense, and the requirements to assure U. S. capability to meet future Russian challenges. Shortly, Vinson, Capitol Hill's spokesman for the Joint Chiefs of Staff, will make a floor speech outlining the present status and future defense requirements. But whenever reprimanding is called for, Vinson will do it in private.

Meanwhile, resolutions for two additional House investigations are being pushed. Rep. Clarence Cannon is seeking authorization to set up a war investigating subcommittee of the Appropriations Committee, of which he is chairman, and Rep. Emanuel Celler, the New York New Dealer who has made a specialty of attacking corporations, is backing a seven-member special House investigating committee to scrutinize war contracts. The House leadership is expected to leave war investigating in the competent hands of Vinson's Armed Services group.

Airmail Separation

A $200,000 appropriation has been voted the Senate Interstate and Foreign Commerce Committee, headed by Sen. Edwin Johnson, for studies looking to the establishment of service mail pay rates on domestic airline routes.

Johnson plans to contract with private accounting firms for the studies. His theory is that the lion's share of "subsidy" to air carriers should be written off as subsidy to the towns which are being furnished uneconomical service.

Wrangling in the House Interstate and Foreign Commerce Committee over legislation authorizing the Civil Aeronautics Board to make a $300,000 study and directing it to separate service mail payments from subsidy payments to air carriers appears to be much ado about nothing. The House Appropriations Committee has already served notice it will approve funds for a CAB study.

Prototype Testing

Chances for enactment of legislation authorizing the Civil Aeronautics Administration to spend $12.5 million over a five-year period on testing of prototypes for new commercial transport and cargo planes is enhanced by Congress' decision to remain in session indefinitely. The bill is now before the Senate for action.

Independent air carriers will open their drive against it today in testimony before the House Interstate and Foreign Commerce Committee. They claim it will do nothing toward solving the pressing need for additional airlift, but will only subsidize the development of "luxury liners" to accommodate an infinitesimal proportion of the population.

New Laws

Aviation measures on which Congress completed recent action will:

- Permit CAA to finance advanced engineering or other training of 25 of its personnel annually, or conduct its own advanced training courses.
- Authorize the Secretary of Agriculture to apply rules and regulations designed to protect U. S. agriculture from importation and spread of injurious pests to air commerce.
- Make false identification of aircraft a criminal offense, subject to a $1000 fine, three years imprisonment, or both. The measure is aimed at deterring illegal immigration and smuggling by air.

PAA Investigation

Count on the House Judiciary Subcommittee, headed by Rep. Celler, to veer away from an investigation of Pan American Airways—until the heat over the recent North Atlantic merger decision has subsided. The subcommittee was scheduled to open hearings on monopoly charges against PAA in July. "It's still on our agenda—the staff is studying the matter," Celler told AVIATION WEEK. "But because of the Korean situation, I don't think we'll be able to get around to hearings for a few months, at least." If PAA's acquisition of American Overseas Airlines "is related to its monopoly position in the airline industry, I am sure the staff will investigate it," he said.

Air Safety Board

The House Interstate and Foreign Commerce Committee is set to approve legislation setting up an Independent Air Safety Board, being aggressively pushed by the Air Line Pilots Assn. But the overwhelming odds at present are that the legislation will be killed off in the Senate.

Editor Robert H. Wood, whose editorials usually appear on this page, is on vacation.

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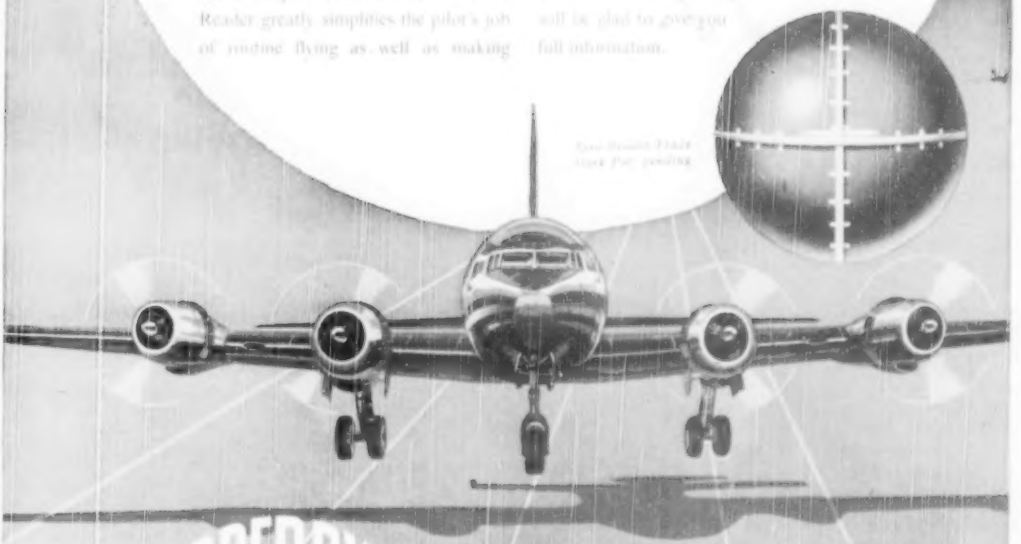

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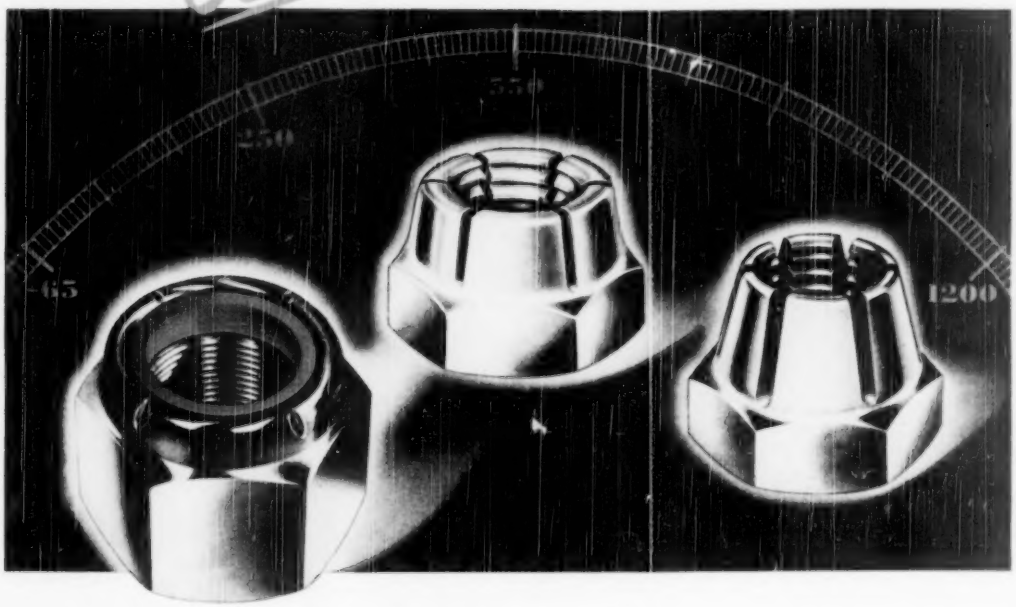

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